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# Critical Factors That Affect Successful Implementation of Enterprise Resource Planning: In Case of Commercial Bank of Ethiopia

Abebech Mulatu

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**CRITICAL FACTORS THAT AFFECT SUCCESSFUL  
IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING:  
IN CASE OF COMMERCIAL BANK OF ETHIOPIA**

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**JUNE 2019**

**Bahir Dar, Ethiopia**

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**THESIS SUBMITTED TO BAHIR DAR UNIVERSITY SCHOOL OF BUSINESS  
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**BAHIR DAR UNIVERSITY SCHOOL OF BUSINESS AND  
ECONOMICS DEPARTMENT OF LOGISTICS AND  
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## DECLARATION

I undersigned declare that the thesis entitled “Critical Factors That Affect Successful Implementation of ERP the case of CBE” is my original work and has not been presented for a degree in any other university and all materials used from other sources have been duly acknowledged and referred.

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## **LIST OF ACRONYM**

ERP- Enterprise Resource Planning

IT- Information Technology

CSFs - Critical Success Factors

BPs-Business Process

MRP- Material Requirement Planning

SAP- System Analyse and Programme

SQL- Structured Query Language

MRP II- Manufacturing Resource Planning

MPS- Master Production Schedule

OEM- Original Equipment Manufacturer

IBM- International Business Management

CIM- Computer Integrated Manufacturing

SPSS- Statistical Package for Social Science

CBE- Commercial Bank of Ethiopia

TMS- Top Management and Support

PM- Project Management

UT- User Training

BPV- Business Plan and Vision

TI- Technological Infrastructure

CM- Change Management

CC- Cooperation and Communication

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## ABSTRACT

*One of the key issues in Enterprise Resource Planning implementation is what critical success factors should be managed to increase the chances of a successful implementation. The purpose of this study is to examine critical factors that affect successful implementation of Enterprise Resource Planning in Commercial Bank of Ethiopia. To achieve this objective quantitative research approach and explanatory research design were used to examine the effect of critical factors that affect successful implementation of Enterprise Resource planning in the case company. Purposive/judgemental sampling was used to select the appropriate samples of the study and to collect data for the study questionnaires were distributed to 200 employees in Commercial Bank of Ethiopia at head office. Correlation and regression analysis were conducted based on 176 responses from 200 questionnaires. Findings of the study showed that all the independent variables are top management support, project management, user training, business plan and vision, technological infrastructure, change management and cooperation and communication were positive and significant correlation with dependent variable which is successful implementation of ERP. In the model summery the test result showed that, the value of R and R<sup>2</sup> was statistically significant. And the multiple regression analysis confirmed that from the 7 independent variables 6 variables have statistically significant relationship to predict ERP implementation success. Only one variable (cooperation and communication) is not statistically significant relationship to predict ERP implementation success. Hence, the researcher recommended that CBE has to give emphasis for critical factors in order to maintain the successful implementation of ERP and reduce the possibility of ERP implementation failure.*

**Key words:** Enterprise resource planning, critical success factors, top management support, project management, user training, business plan and vision, technological infrastructure, change management, cooperation and communication.

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# CHAPTER ONE

## INTRODUCTION

This chapter deals with background of the study and statement of the problem. Further it presents objectives of the study, significance of the study, scope of the study and organization of the paper.

### **1.1. Background of the study**

Enterprise resource planning (ERP) systems is one of the most popular organisation wide software packages to emerge in recent years. Davenport (1998) suggests that ERP is the most important development in the corporate use of information technology (IT) in the 1990s. An ERP system is an integrated software solution that spans the range of business processes that enables companies to gain a holistic view of the business enterprise (Ehie, 2005). ERP allows the integration of functions, divisions of businesses in terms of information exchange and flow, and the integration of business functions as diverse as accounting, finance, human resources, operations, sales, marketing, customer information and even the supply chain (Koh, 2006).

The Enterprise Resource Planning (ERP) system is a software solution that has been conceived to unify all information systems of all departments into a single integrated system that manages all of functional areas in a company such as financial and cost accounting, planning and manufacturing, sales and marketing, materials management, human resource management, distribution and transportation (Mahraz 2018). It is considered as a backbone of the information systems in an enterprise, and it supports all parts of business processes by providing flow of information between all business functions on all levels within an enterprise. ERP system offers a competitive advantage especially in terms on the value of the information. According to Abd Elmonem (2017) sharing data and information between enterprise departments helps in many aspects and aims to achieve different objectives.

However, ERP system implementation is a big challenge for every organization. Different factors influence positively or negatively on the successfulness in implementation of ERP system. These factors are known as critical factors. Critical success factors (CSFs) become the reasons of successful implementation of ERP system. Rockart (1979) defined CSF as the

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limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization. Additionally Slevin (1987) defined CSFs as factors which, if addressed, significantly improve project implementation.

Thus, one of the key issues in ERP implementation is what critical success factors (CSFs) should be managed to increase the chances of a successful implementation. In this case, CSFs are those things that the organization must 'get right' in order for the ERP system to work effectively (Slevin, 1987). The purpose of the study was to examine critical factors that affect ERP implementation success in Commercial Bank of Ethiopia.

Various studies related to the success factors of ERP implantation was conducted in the past. (ALdayel, Aldayel& Al-Mudimigh, 2011; Karande, Jain, &Ghatule, 2012; Hong and Kim, 2002; Aradhana Gandhi, 2015; Shatat, 2015; AL-Sabaawi,2015;Zouine&Fenies, 2014). However, the focus has been on ERP success in developed countries. According to Soltani, Elkhani, and Bakri (2013), the factors that affect ERP success in developed countries need to be researched in the context of developing countries. In addition in recent times, there are very limited researches about ERP systems implementation in Ethiopian context. From the studies, Tekleab (2017) conducted a research on the effect of implementing ERP on human resource administration. The other studies related to the assessment and evaluation of the overall effectiveness of ERP system implementation in Ethio telecom (Hilemeskel, 2016). However the above mentioned studies focused on the effect of implementation ERP system and challenges of ERP implementation. The critical factors that affect successful implementation of ERP are not studied independently. The study was with this gap in mind, conducted the study on critical factors that affect successful ERP implementation system in commercial bank of Ethiopia.

For this study the researcher used top management support, project management, user training, business plan and vision, technological infrastructure, change management and cooperation and communication were taken as a success factor of ERP implementation. The study expected to contribute organizations can better understand and identify success factors that enable the efficient implementation of ERP project. Top management, supply chain managers and IT administers can also plan appropriate interventions to foster the organizational culture for an effective implementation of ERP system. The study helps the organizations to be aware of success factor of ERP which reduce the likelihood of ERP failure and achieve effective usage of ERP.



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### **1.1.1. Background of the Organization**

Commercial Bank of Ethiopia was established in 1942 as The State Bank of Ethiopia. CBE was legally established as a share company in 1963 and in 1974, it was merged with the privately owned Addis Ababa Bank. Since then, it has been playing significant roles in the development of country both economically and technologically. The bank is a pioneer to introduce modern banking to the country like Western Union Money Transfer Services and currently working with other 20 money transfer agents like Money Gram, Atlantic International (Bole), and Xpress money. It has more than 1340 branches stretched across the country and four branches in South Sudan. It is leading Africa bank with assets of 646.69 billion Birr as of (CBE, 2019). The first bank in Ethiopia to introduce ATM service for local users. Currently, CBE has more than 18.8 million account holders and the number of Mobile and Internet Banking users also reached more than 1,736,768 as of June 30th 2018. Active ATM cardholders reached more than 4.4 million. As of June 30, 2018, 1708 ATM machine and 11,796 POS machines were available.

Generally, the Banking industry is growing relatively at a faster rate in Ethiopia than ever before. Due to these banking services being improved and supported by modern technologies in order to integration capability, standardization, and improvement of processes, easy information access, and faster decision-making facilities. Therefore, commercial bank of Ethiopia is implementing Oracle ERP into its organization.

### **1.2. Statement of the problem**

ERP is the equivalent of the organization's central nervous system, sensing information about the condition of different parts of the business and relaying the information to other parts of the business that need it. The information is updated in real time by those who use it and yet is always available to everyone connected to the ERP system (Nigle slack, 2015).

ERP is an instrument that increases the speed of processing activities of business, leads to an increase in profit and reduce cost. However, implementation of ERP is complex process that is often met with failure (Saleem, Hussain, & Hayat, 2016). The use of new technology, especially when the technology is intended to replace a legacy system is considered a tedious task. Ahmad, Ibrahim, & Garba (2015) asserted that the introduction of new technology is fraught with problems that are often linked to inadequate requirements, end-user resistance to adapting to a new technology, and lack of management support. When an organization decides to implement an ERP system, it typically involves an extensive reconstruction

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of business processes and the dispersion of the new software to support these new business processes (Robey, Ross & Boudreau, 2002).

Furthermore, an implementation primarily impacts the employee in changing the nature of tasks, workflows and the job itself (Morris & Venkatesh, 2010; Bala & Venkatesh, 2013). It should hence be vital for any company to understand the perceptions of the actual users of the ERP systems before initiating an implementation of a new system (Aladwani, 2001; Umble, Haft & Umble, 2003). Many successful cases of ERP system implementation have been reported, but many companies have announced their ERP system as failed system. The failure of ERP system or the inappropriate usage of the system will definitely cause a huge loss for the organization and may even lead to bankruptcy (Davenport, 1998; Chen, 2001; Davenport et al., 2004).

Therefore, the common challenges faced taken in to account, it is considered important to examine critical factors that affect successful implementation of ERP in Commercial Bank of Ethiopia. In order to solve the problems, Peslak & Boyle (2010) state that one of the key issues in ERP implementation is what critical success factors (CSFs) should be managed to increase the chances of a successful implementation of ERP. In this case, CSFs are those things that the organization must 'get right' in order for the ERP system to work effectively. Further they suggested that top management support, project management, communication, education and training, change management, technological infrastructure and effective business plan and vision play an important role in achieving success in an ERP environment.

There are many benefits associated with an ERP system. All can lead to increased efficiency and will give a company a more competitive advantage in the global economy. In order to achieve this, companies should manage ERP project, provide training and education for users, facilitate technological infrastructure and set appropriate business plan and vision during the implementation process in order to deliver the above-mentioned benefits, and avoid ERP system failure (Ekman and Thilenius, 2011; Maditinoset al., 2012).

### **1.3. Research objectives**

#### **1.3.1. General objective**

The general objective of this study was to examine critical factors that affect successful implementation of Enterprise Resource Planning (ERP) in commercial bank of Ethiopia.

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### **1.3.2. Specific objectives**

Specifically, the study was achieved the following specific objectives:

- I. To examine the effects of top management support on successful implementation of ERP
- II. To examine the effect of project management on the successful implementation of ERP
- III. To examine the effect of user training on successful implementation of ERP
- IV. To examine the effect of business plan and vision on successful implementation of ERP
- V. To examine the effect of technological infrastructure on successful implementation of ERP
- VI. To examine the effect of change management on successful implementation of ERP
- VII. To examine the effect of cooperation and communication on successful implementation of ERP

### **1.4. Significance of the study**

Examining the critical factors that affect successful implementation of ERP could have the following significance to the academicians, researchers, corporate managers, policy makers; and generally for business practitioners, and specifically, for the case company. Specifically, this study has the following main significances:

- Help to recognize critical success factor practices are contributing for success of ERP implementation.
- It support to better understanding about critical factors that affect ERP implementation effectiveness which reduce the possibility of ERP failure.
- Assist to future researchers who are willing to conduct study on this topic.

### **1.5. Scope of the study**

There are many critical factors that affect successful implementation of ERP. However, it is hard and uncontrollable to perform the study in every single one area in terms of time, finance, and research manageability. Therefore, this study was delimited to only seven success factor of ERP implementation effectiveness. The study was concern only in commercial bank of Ethiopia it does not cover in other areas. Methodologically the study was delimited by quantitative research approach.

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## 1.6. Definitions of key Terms

**Enterprise Resource Planning (ERP):** An ERP system is an integrated software solution that spans the range of business processes that enables companies to gain a holistic view of the business enterprise (Ehie, 2005).

**Critical Success Factors CSFs):** These are factors that must be carefully selected to insure successful implementation or upgrade of an ERP system (Bingi, Sharma, and Godla, 1999).

**Top management support (TMS):** is adequate support from first level managers and commitment of resource (Basri, 2016).

**Project management (PM):** is the process of on-going management of the implementation plan (Rabaa'I, 2009).

**User training (UT):** is training used for robust understanding of how the system works and how to use it (Bajwaet al., 2004).

**Business Plan and Vision (BPV):** a clear project plan with comprehensive vision that can fit with the organizational goals and it provide a clear guidance to the project team (Kronbichler et al., 2009).

**Technological infrastructure (TI):** is refers to selection of appropriate ERP package, adequate ERP version, adequate software configuration and suitability of software and hardware (Jarrar, Al-Mudimigh, Zairi, 2000).

**Change management (CM):**a programme to help employees to understand and accept the new changes that will occur in their operations (Burcaet al., 2005).

**Cooperation and Communication (CC):** is communication among several departments /hierarchies, e.g. between project team and end users about ERP implementation (Sherry&Finney, 2007).

## 1.7. Organization of the study

The study has five parts and the report was organized in the following manner. First, the introduction highlight the nature of the research and background Information; with the research objectives and significance of the study, second part covers related literature review that are essential to the research. The third part present the detailed methodology of the research which covers philosophy of the research, the research design, research approach,

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target population, sampling size and sampling technique, nature and source of data, method of data collection, method of data analysis, validity and reliability and ethical consideration. The fourth part presents data analysis for the research problem using the specified methodology, and the fifth part covered summary of findings, possible conclusions and recommendations.

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## CHAPTER TWO

### REVIEW OF RELATED LITREATURES

#### 2.1. Introduction

This chapter covers topics related to concept of ERP, evolution of ERP, ERP implementation and its benefits, critical factors and their effects, conceptual frameworks and research hypothesis.

#### 2.2. Theoretical Review

##### 2.2.1. ERP Concept

Enterprise resource planning (ERP) systems are defined as “comprehensive, packaged software solutions that seek to integrate the complete range of a business's processes and functions in order to present a holistic view of the business from a single information and IT architecture”(Klaus, Rosemann, & Gable, 2000). These systems assume a modular structure and provide information integration across every business area using a shared database (Davenport, 1998). ERP started in the mid-1990's and were used to outline and organize business processes across all the organisational groups. This integrative approach guaranteed that tasks and processes were performed always in the same way in every place in the organisation (McAfee, 2009). Traditionally oriented for capital-intensive industries ERP systems achieved a maturity state of development. Tough in recent years, ERPs are being introduced to other sectors, such as retail, education, finance, insurance, healthcare and hotel chains (Shehab, Sharp, Supramaniam, & Spedding, 2004).

An ERP system is the core software in an organization that used to coordinate information among every area of the business in the organization. It helps the organization manage organizational-wide business processes (BPs) by the one common database and shared management IT tools. The ERP nature of integrating organizational-wide information is important for efficiency of the company, because the horizontal information flow promotes flexibility and rapid decision making (Monk & Wagner, 2008). Also, automation changes the way companies deal with others like suppliers and customers (Bingi et al., 1999). In addition, ERP provides organization the best practices implementation (Hunton, Lippincott, & Reck, 2003).

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### **2.2.2. ERP Evolution**

The history of the ERP system as we know it today was made of a continuous evolution and had five important milestones (Jacobs & Weston, 2007):

**The 1960s: first computers in industry; the reorder point; and the material requirements planning (MRP).**

In the 1960s, companies could afford to keep lots of “just-in-case” stocks on hand to satisfy customer demand. Most of customised software was designed to handle large volumes of inventory (Umble, Haft, & Umble, 2003). Following this idea, designed in the 1950s, MRP was one of the first business applications to support concepts like material master data and bill-of-materials across all products and parts in one or more plants (Klaus et al., 2000). With the increasing success, the concept rapidly evolved to a more comprehensive method that calculated all the necessary materials needed to fulfil any production order, the Material Requirements Planning (MRP) (Klaus et al., 2000).

**The 1970s: MRP consolidation and the enhancement of computer hardware and Software.**

Although MRP meant a technological breakthrough, it wasn't a customer oriented technique. This level of complexity, the lack of proper integration, data accessibility, and flexibility made MRP difficult to adopt (Chung & Synder, 1999). Despite all the difficulties and drawbacks, during this decade, MRP systems started to integrate all aspect of production planning and control cycle (Klaus et al., 2000).

The 70s also saw the birth of what would later become the major ERP vendors. Dating from the beginning of the decade, SAP (System analyse and Programme), was born in Mannheim, Germany. The primary intention of its creators was to deliver a standard software package for business. After this marketing breakthrough, also various enterprises like Lawson Software, Edwards, Oracle, and Baan, adopt this pre-packaged solution to make their way into success (Jacobs & Weston, 2007). By the end of the decade, Oracle offered the first commercial relational database management with the well-known Structured Query Language (SQL) which, in time, would become a standard (Deutsch, 2013).

**The 1980s: Arrival of the manufacturing resource planning (MRPII).**

By the beginning of the 1980s, Edwards started to incorporate an increasing number of new functions to the MRP packages. At certain point, the term MRP started to stand for

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manufacturing resource planning rather than just material requirements planning. This fact led to a new acronym: the MRPII (Jacobs & Weston, 2007). MRPII process starts with a Master Production Schedule (MPS) based on long-term sales forecast. After the materials management module computes the material requirements, a capacity management module integrates the available production resources in the planning process. Once the planning process is optimized, a production schedule is created and schedule algorithms specify the assignment of workloads to machines/resources (Klaus et al., 2000).

The manufacturing environment where MRPII was born was guided by a demand-driven push philosophy, where batch production was the standard and the original equipment manufacturer (OEM) products were relatively complex feature-dependant. The plant layout was product oriented and had a high degree of processes decoupling (Chung & Synder, 1999).

At the end of the 80s, IBM introduced the Computer Integrated Manufacturing (CIM) term in the COPICS software. This new framework had unique capabilities integrating all processes across the enterprise. The path to ERP was opened and the across the enterprise idea could finally be materialised (Jacobs & Weston, 2007)

### **The 1990s: MRPII and the first ERP systems.**

Although the end of 1980s IBM's CIM innovation was a good improvement, it lacked the accounting reflection of the entire inbound and outbound inventory from raw materials to finished goods. Also the receiving and shipping transactions were not reflected in real time in the general ledger (Jacobs & Weston, 2007; Klaus et al., 2000).

In 1992, the SAP R/3 ERP product was released. Introducing a server-client hardware design, this new software suite represented a revolution in terms of flexibility. This paradigm shift provided the dispersal of a huge computer load to various small computers, lowering the cost effort of hardware investment. Also the open-architecture approach enabled third-party companies to develop specific software and integrate with SAP R/3 (Jacobs & Weston, 2007).

In terms of technology, most ERP systems include three distinct features: the data dictionary; the middleware; and the repository. The data dictionary is the structure statement and can be used across all organisational functional areas. The middleware is a system layer that allows data to be exchanged from a central to a remote system. Finally, the repository is the foundation of all business structure since it includes the definitions of the business processes, objects, and the organisation model (Chung & Synder, 1999).



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### **The 2000s: Software vendors' consolidation.**

The millennium bug (Y2K) was the event that marked the maturing of the ERP industry (Jacobs & Weston, 2007). After the astonishing growth in the 90s decade, the technology and “dot com” industries witnessed a serious stock crash which led both large and small vendors to re-evaluate their strategic positioning. The big players at the beginning of 2000 (SAP AG, Oracle, PeopleSoft and Edwards) were looking forward to increase market share throughout competitor acquisitions, mergers, financing the development of new products. As a result of this tremendous competitive environment, in 2005, Oracle consummated the hostile takeover over the previously merged PeopleSoft/J.D. Edwards. Oracle and SAP AG became the industry's two major players (Jacobs & Weston, 2007).

**Table 2.1: Evolution of ERP**

1960	1970	1980	1990	2000 & Beyond
Materials Requirements Planning	Manufacturing Resource Planning	MRP II	Enterprise Resource Planning	Mobile ERP, Cloud ERP, Analytic etc.

### **2.3. ERP implementation**

Implementation of ERP is very expensive and complex undertakings, but once it's successfully implemented, significant improvements can be achieved such as easier access to reliable information, elimination of redundant data and operations, reduction of cycle times, increased efficiency hence reducing costs (Zhang et al., 2003), it is the largest single IT investment, impacts the greatest number of individuals, and is the broadest in scope and complexity (Chang et al. 2008.).The implementation of an ERP system differs from that of any traditional information system due to its integrated nature which causes dramatic changes on work flow, organizational structure and on the way people does their jobs (Matendela & Ogao, 2013). Organization's people and processes must undergo significant change in response to the introduction and implementation of an ERP system. It hasmany issues that confront ERP implementation, and organizations continue to underestimate the complexity of implementing an ERP system throughout its life cycle (Olson, Zhao 2007; Motiwalla, 2009). Thus, the issues surrounding the implementation process have been one of the major concerns

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in the domain of ERP and different kinds of research in relation with ERP implementation are observed from the literature.

The aim of implementing ERP for a company can be various, despite cutting the running costs, some companies just want to integrate its multi business units, or integrate redundant information systems or databases (Umble et al., 2003).ERP implementation is an on-going process instead of a one-time project (Monk &Wagner, 2009). The ERP implementation project should be led by business needs and requirements instead of singly IT needs (Umble et al., 2003), and it is practically impossible to take all benefits from the system for an organization (Monk & Wagner, 2009).ERP implementation gives a wide range of benefits in terms of functionality; many businesses believe the ERP system can deliver strategic competitive advantages. Therefore, it is not surprising that many organizations have already adopted ERP systems (Ngai et al., 2008; Davenport, and Brooks, 2004).ERP systems provide firms with two new and different types of functionality: a transaction processing function, allowing for the integrated management of data throughout the entire company, and a workflow management function controlling the numerous process flows within the company. ERP facilitates the flow of information between all the processes in an organization (Poonam, 2010).According to Davenport(1998) an enterprise resource planning system is a packaged software system that enables a company to manage the efficient and effective use of resources (materials, human resources, finance, etc.) by providing a total, integrated solution for its information processing needs. It supports a process-oriented view of an enterprise and standardizes business processes across the enterprise.

The potential benefits of successfully implementing an ERP system is large, and even, according to (Markus et al., 2000), critical to organisational performance and survival. ERP systems can potentially allow a company to manage its business better with potential benefits of improved process flow, better data analysis, higher quality data for decision-making, reduced inventories, improved coordination throughout the supply chain, and better customer service (Gattiker and Goodhue, 2005; Lengnick-Hall et al., 2004; Gupta, 2000; Fan et al., 2000). Zheng et al. (2000) meanwhile suggest that ERP systems improve the efficiency of management decisions and plans and increase the flexibility with adjustments of functionality to react to business needs while Huang and Palvia (2001) suggest that ERP helps a manufacturer or a service business manage the important parts of its business. All of this point to improved profit margins (Fan et al., 2000).

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## **2.4. Critical success factors**

The CSFs were first defined by Rockart (1979) as those specific regions that an enterprise requires to “get right” for successful corporate competition. Endorsing it further, Bullen (1981) defined CSFs as those limited zones where adequate results will guarantee effective competitive practices at the individual, departmental, or organizational level. Hong and Kownhong (2002) provided an organizational fit for success factors for ERP. As the name implies, the purpose of any CSF approach is the determination of the set of factors that the manager considers critical for his or her success. Once identified, these factors are stated as his or her objectives and the information required to monitor their performance is then identified (Dadashzadeh, 1989).

According to Leidecker and Bruno (1984) CSF are those characteristics, conditions or variables that, when properly sustained, maintained, or managed, can have a significant impact on the success of a firm competing in particular industry. Pinto and Slevin (1987) defined critical success factors as factors which, if addressed significantly improve project implementation chances.

## **2.5. Critical success factors of ERP implementation**

Gargeya and Brady (2005) proposed six CSFs during the process of ERP system implementation, which are: 1) working with functionality/maintained scope; 2) project team/ management support/ consultation; 3) internal readiness/ training; 4) dealing with organizational diversity; 5) planning/ development/ budgeting; and finally 6) adequate testing. Other academics suggest additional critical IT capabilities that allied with the CSFs for optimum outcomes of the ERP system implementation such as IT leadership, business system thinking, relationship building, architecture planning, contract facilitation, technology fixing, informed buying, supplier development and contract monitoring (Feeny and Willcocks, 1998). Taken these together, it can be argued that there are many different views regarding critical success factors lead to successful implementation of ERP. While some scholars take a more holistic view regarding CSFs (Kronbichler et al., 2009); some are more concerned with the internal environment (Gargeya and Brady, 2005), technical issues or IT capabilities (Feeny and Willcocks, 1998).

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Somers and Nelsons (2004) identified 22 CSFs into 2 categories: Key Players and Key Activities. The Key Players include any person or any group of people that affected by the implementation of the project, including: top management, project champion, implementation consultants, project team, customer, and vendor. Whereas Key Activities include the following: management of expectations, project management, selection of appropriate package, user training, customization, data conversion, business process reengineering, architecture definition, dedicating resources, establishing clear goals and objectives, education on new business processes, interdepartmental communication, and interdepartmental cooperation. A critical view of the abovementioned studies (Feeny & Willcocks, 1998; Gargeya & Brady, 2005; Kronbichler et al., 2009; Somers & Nelsons, 2004) reveal ten commonly cited CSFs: top management support; teamwork; project champion; project management; business plan; vendor support; user training; change management; business process reengineering; and communication. In the following section, seven CSFs used in this research are explained in order to provide a better overview of the CSF.

### **2.5.1. Top Management Support**

Top management support is one of the most frequently factors that support the success of ERP system (Kronbichler et al., 2009; Parr and Shanks, 2000; Shanks et al., 2000; Somers and Nelson, 2004). Nah and Lau (2001) noted that top management support is a very important factor that helps companies to successfully implement the ERP system. It is the key for the successful implementation of the ERP system (Loonam and Donagh, 2005). Top management is committed to support the ERP system across the implementation stages and they are responsible for the success of the project (Beheshti, 2006).

According to Burca et al.(2005) top management is responsible to direct and monitor the ERP project and the associated training programme, and to make the employees more involved in the project and the related programme to run the ERP system project smoothly. Top management need to support the implementation team effectively and empower their employees through continuous training in order to accept the idea of change.

The support, commitment, authority and leadership from top management are important to secure the employee acceptance of the changes brought by the project (Aladwani, 2001), and is related closely to the success of the whole project (Ifinedo, 2008). The support and commitment from top management are part of the social factors that can improve the ERP

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system usage of employees in the company, then achieve a more successful implementation (Chang, Cheung, Cheng, & Yeung, 2008), because the top management influences can facilitate the user acceptance of new system by broadcasting the system benefits to the employees (Aladwani, 2001). Another explanation is that the commitment from top management will percolate down to the whole organization and ultimately result in an overall organizational commitment (Bingi et al., 1999). Besides, Nah et al. (2001) suggested the top management should set policies on new systems usage to guarantee its spread throughout the organization.

### **2.5.2. Project Management**

A successful implementation of ERP system requires an effective project management (Rabaa'I, 2009). Project management is the process of on-going management of the implementation plan. It involves planning, allocating responsibilities, training, and determination of the success measures. Project management needs a steering committee which made up of senior management from different departments, project management, and the system end-users who should be involved in several phases of the ERP system lifecycle. The project management should follow a clear methodology and appropriate management structure in order to achieve successful implementation of ERP project (Nah and Lau, 2001; Somers and Nelson, 2004; Finney and Corbett, 2007). Typically, before the implementation of the ERP system, project managers must understand the ability of the company to adopt the system and achieve optimum use. The success of the project depends on the company readiness in different aspects such as budget, time, infrastructure, etc. (Schniederjans and Kim, 2003). Therefore, companies must be ready prior to this huge implementation to gain better business performance.

Effective project management is critical for the successful ERP implementation (Umble, Haft & Umble, 2003; Nah & Delgado, 2006). Bingi, Sharma, and Godla (1999) found that a lack of proper understanding of the project needs and the inability to provide leadership and guidance to the project are the main factors when ERP implementation fails. Thus, effective project management should define clear project objectives, develop a work and resource plan, and carefully track the project's progress.

### **2.5.3. User Training**

The complexity of ERP system requires dedication and involvement of users and thus it is important for employees to be involved in all stages of implementing ERP system

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(Kronbichler et al., 2009). The users of ERP system need to understand the benefits of using ERP system and aware of the technical know-how in order to reduce the level of user resistance to new technology and resistance to change (Rabaa'I, 2009). In relation to that, extensive education and training programme becomes essential during the process of implementing ERP system (Gargeya and Brady, 2005; Kronbichler et al., 2009; Rabaa'I, 2009). However, if companies ignore the users' involvement and training during the ERP system project this might lead to failure to implement ERP system.

User training is aimed to achieve a solid understanding of the system to apply their own knowledge of BP into using of the system. The ERP cannot play full power if the users are using it improperly. Also, the system knowledge obtaining is through the practical using of it, therefore (Umble et al. 2003) suggested the post-implementation training is needed.

Therefore, extensive attention must be given to the users of the system to avoid negative results (Stewart et al., 2000). The users training programme should be conducted regularly to involve the users with the system and to introduce the system gradually to them. This will help the users to accept the idea of change and use the system effectively (Burca et al., 2005). End user training has been recognized a critical factor for ERP implementation (Bajwaet al., 2004). Due to the complexity of the integrated ERP system, end user training is essential for a robust understanding of how the system works and how to use it. Consequently, appropriate end user education and training will maximize ERP benefits and increase user satisfaction.

#### **2.5.4. Business Plan & Vision**

Nah and Lau (2001) noted that the business vision must be stated clearly, and measurable goals of the ERP project should be clear and understandable. Clear project plan with comprehensive vision that can fit with the organizational goals are critical to ensure the success of the ERP project implementation. The project plan will provide a clear guidance to the project team which will help them to concentrate on the project goals and will avoid any misunderstanding of the project requirements and that eventually lead to successful ERP system implementation (Kronbichler et al., 2009).

For the strategic business goal, Umble et al. (2003) suggested the key people in the organization should create a clear and compelling vision for the organization in the coming three to five years, to specify the operation rules to satisfy other stakeholders such as empower employees, customers and suppliers. Finney and Corbett (2007) also proposed an

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organization should build an organizational vision firstly in order to identify the project goals afterwards.

### **2.5.5. Technological infrastructure**

The selection of the adapted ERP software is difficult because there various of ERP packages available on the market and every product has its own strengths and weaknesses, both from products site and ease of implementation (Ghosh,2002). It is necessary to continuously measure the performance of the ERP implementation to assess the developments and the problems occurring (Jarrar, Al-Mudimigh, Zairi,2000) This CSF covers the following CSFs mentioned in the literature: Careful package selection, architecture choices, system analysis, selection and technical implementation, adequate ERP version, adequate software configuration, ERP software package selection / careful selection of the appropriate package, suitability of software and hardware, defining the architecture and monitoring and evaluation of performance. According to (Patel, Picard,2007) the system developers and managers should concentrate on developing better systems rather than focusing on user satisfaction. Quality Assurance is essential, it should be established in the early phases of ERP implementation to avoid wrong results and costly correction afterwards (Wee,2000) This CSF consists of software development, testing and troubleshooting and reduce trouble shooting.

The quality of IT staff (i.e., knowledge of technological changes and up-to-date skills) is cited among the important factors required for IT systems success in general and for ERP implementation success in particular (Essex et al., 1998).

### **2.5.6. Change Management**

Change management is another frequently cited factor that determines the success of ERP system implementation (Rabaa'I, 2009). Shaul and Taber (2012) stated that the implementation of new ERP system is typically encountered with high resistance from the end users as they are worried that the new system might change many of their routine job lifestyle such as ease of use, importance, job status, responsibilities, access to critical information, and job security. However, this problem should be dealt with during the planning phase and through extensive change management programme.

Burcaet al. (2005) stated that many of the employees need a change management programme to help them to understand and accept the new changes that will occur in their operations.

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Therefore, to achieve a successful ERP implementation it becomes mandatory to educate and train the users of the ERP system on the new change that affects their daily tasks (Park and Kusiak, 2005).

Ehie and Madsen (2005) stated that ERP implementation involves more than changing software or hardware systems. Ideally, by reengineering business processes, ERP implementation can help an organization to benefit from higher levels of efficiency and improved performance. Therefore, ERP implementation may cause changes that lead to resistance among employees (Glover, Prawitt & Romney, 1999). Consequently, balancing conflicts between staff and technology and effectively managing employees in the change process are key elements for the successful ERP implementation (Ash & Burn, 2003).

Change management is important in ERP implementation, since it starts at the project phase and continues throughout the whole project (Nah et al., 2001). Among the change management activities, the core objective of ERP implementation should be kept that it is to improve the business of the organization instead of only its IT tools (Umble et al., 2003). Top management should play an active role in the organizational change, to manage the change within the company, and their role is very effective when coping with conflicts (Bingi et al., 1999).

### **2.5.7. Cooperation & Communication**

Cooperation and communication is considered as essential to the success of implementing ERP system (Kronbichler et al., 2009). Effective communication should take place at all stages of implementing ERP system so that employees could be aware of the progress and understand the benefits of having enterprise system in place (Rabaa'I, 2009). It is equally important to define goals and communicate the results to the involved participants (Kronbichler et al., 2009). This can be done via face to face communication such as regular update meetings or asynchronous communication such as email or posters in conspicuous locations (Rabaa'I, 2009).

For an ERP implementation, communication among several departments/hierarchies, e.g. between business and IT personnel, is inevitable. Therefore, a communication plan is required to make sure that there is open communication within the whole organization, from the top management to shop-floor employees, and with the outer world as suppliers and customers (Sherry, 2007). Communicating ERP project with employees is essential to build



awareness about the importance of these projects to the organization. This will enhance them to cooperate with the implementation team and participate in change. Another important point that should be communicated with the employees is how the system will impact their jobs. Managers need to communicate the importance of the project, and the employees should be informed in advance about the scope, objectives and the changes that will occur (Sumner, 1999).

## 2.6. Empirical Review

Various studies related to the success factors of ERP implantation were conducted in the past. Some researches with their objectives and major findings are summarized in the following table.

**Table 2.2: List of empirical literatures and their findings**

Author/ Paper	Objective of the paper	Critical Factors	Findings
Shatat (2015)	To investigated the CSFs that play a crucial role during the implementation process.	Top management support, monitoring and evaluation of performance, project champion, clear goals and objectives, user involvement, strategic IT planning, user training and education, teamwork and composition, vendor support, education on new business processes	There is no unique significant contribution of any of the CSFs in ERP implementation.  both the Strategic IT Planning factor and Teamwork & Composition factor make a major contribution to the ERP implementation as they have the largest beta coefficient.  The Project Champion factor and Education on new Business Processes factor make minor contributions in the ERP implementation as they have the lowest beta coefficient among the CSFs,

Al-Sabaawi(2015)	To describe CSFs for ERP implementation	Top management support, project management, user training and education, business plan and vision, technological infrastructure, departments (stakeholder) participation, change management and communication	The most important success factors were ERP implementation success are Project management, Technological infrastructure and Commitment and support of top management.
Hong Seng Woo(2007)	The objective is to provide Chinese enterprises implementing ERP with knowledge about ERP implementation critical success factors.	Top management, project team, process change, education and training, communication	Top management – strong, committed, and visible top management to promote ERP and to support the implementation process and Project team, process change, education and training and communication are CSFs for the organization.
Aradhana (2015)	To find interrelationships among the factors that impact the process and result of ERP implementation	Top management commitment and support, organizational culture, communication, Consultant selection, project management, user's involvement and training, implementation strategy and time frame	Top management Commitment and Support and Organizational Culture & Communication are strongest CSFs, which have strong driving and weak dependence power.  Organization Culture and Communication along with Top Management Commitment and Support and Consultant Selection and Relationship are at the root of other CSFs and have great influence on other success factors.  -Effective Project

			management, user's Involvement and training and implementation strategy and time frame are the factors with low driving power and high dependence.
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In recent times, there are very limited researches conducted about ERP systems implementation in Ethiopian context. From the studies, Cherinet (2017) conducted a research on the effect of implementing ERP on human resource administration. He investigates effect of implementation ERP system on human resource administration, explore the flexibility and user friendly of the new system on human resource management practices, and identify the challenges and problems which hamper the effectiveness of the ERP system. The other studies related to the assessment and evaluation of the overall effectiveness of ERP system implementation in Ethio telecom (Guze, 2016). He assess the overall ERP system implementation process, identifies ERP system implementation challenges, devise solution for challenge of ERP implementation.

However, the above mentioned studies focused on the effect of implementation ERP system and challenges of ERP implementation. The critical factors that affect successful implementation of ERP are not studied independently. So, this study has tried to work on this gap by examining critical factors that affect successful implementation of ERP.

## 2.7. Conceptual frameworks

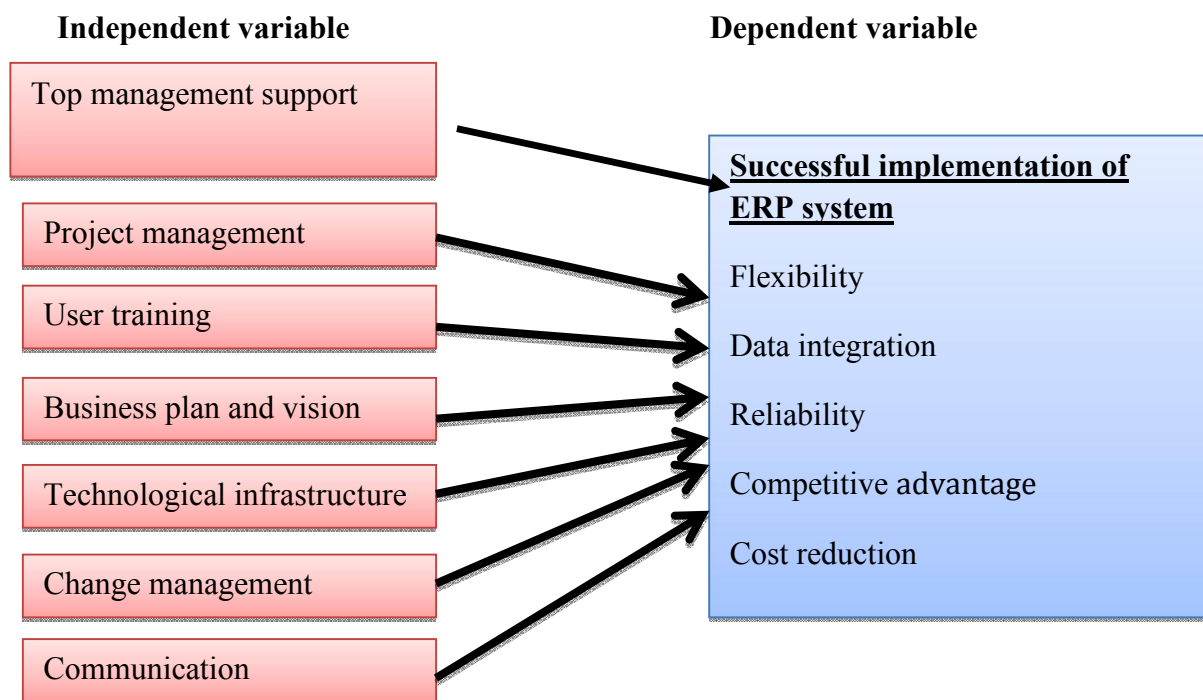


Figure2. 1 Conceptual Framework of the study

Source; developed by the researcher

From the above conceptual framework; Top management support and commitment, project management, user training and education, business plan and vision, technological infrastructure, change management and communication are considered as independent variables whereas successful implementation of ERP is considered as dependent variable.

## 2.8. Research hypothesis

### 2.8.1. Top management support and successful implementation of ERP

Top management support describes the extent to which executive managers of the adopting firm provide the attention, resources, and authority required for ERP implementation (Wang and Chen, 2006). Top management support is a prerequisite for the successful ERP system implementation. Top managers supervise the whole implementation procedure, enable resource distribution, and support conflict management (Wang and Chen, 2006). Moreover, top management has the responsibility to align the new ERP system with the current business practices and prepare the employees for the change brought by the new technology.

Top management support – the ERP implementation was in general a top-down decision and the success of such an implementation depended on the alignment of the ERP adoption with strategic business goals (Yingjie, 2005). Top management support has been consistently identified as the most important and crucial success factor in ERP system implementation

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projects. Top management support in ERP implementation has two main facets: (1) providing leadership; and (2) providing the necessary resources. To implement ERP system successfully, management should monitor the implementation progress and provide clear direction of the project. They must be willing to allow for a mind-set change by accepting that a lot of learning has to be done at all levels, including themselves (Bhatti 2002).

***H1: Top management support has a positive effect on successful implementation of ERP.***

### **2.8.2. Project management and successful implementation of ERP**

Project Management involves the use of skills and knowledge in coordinating the scheduling and monitoring of defined activities to ensure that the stated objectives of implementation projects are achieved. The formal project implementation plan defines project activities, commits personnel to those activities, and promotes organizational support by organizing the implementation process (Bhatti, 2002; ALdayel and Al-Mudimigh, 2011).

***H2: Effective Project management has a positive effect on successful implementation of ERP.***

### **2.8.3. User training and successful implementation of ERP**

When the ERP system is up and running it is very important that the users be capable to use it, hence they should be aware of the ERP logic and concepts and should be familiar with the system's features (Yingjie, 2005). Jafari, et.al (2006) Stated that there are three aspects concerning the contents of training are: Logic and concept of ERP, Features of the ERP system software, and hand- on training.

***H3: User training has a positive effect to on successful implementation of ERP.***

### **2.8.4. Business Plan and Vision and successful implementation of ERP**

The business must have clear visions and business plan for ERP project. It is very important to identify goal before implement ERP project. Business plan reflect a long term vision. Clear vision and mission provide the guideline for ERP implementation (Chang et. al., 2013).Nah (2003) stated that one of the biggest problems ERP project leaders face comes not from the implementation itself, but from expectations of board members, senior staff, and other key stakeholders. It is important to set the goals of the project before even seeking top management support. Many ERP implementations have failed as a result of lacking clear plans (Al-Fawaz, et.al, 2008).

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***H4: Business Plan and Vision has a positive effect on successful implementation of ERP.***

#### **2.8.5. Technological infrastructure and successful implementation of ERP**

Management must make a careful choice of an ERP package that best matches the legacy systems, e.g. The hardware platform, databases and operating systems(Yingjie,2005) (Frimpon, 2012). Bhatti (2002) argued that adequate IT infrastructure, hardware and networking are crucial for an ERP system's success. It is clear that ERP implementation involves a complex transition from legacy information systems and business processes to an integrated IT infra-structure and common business process throughout the organization. Hardware selection is driven by the firm's choice of an ERP software package. The ERP software vendor generally certifies which hardware (and hardware configurations) must be used to run the ERP system. This factor has been considered critical by the practitioners and as well as by the researchers.

***H5: Technological infrastructure has a positive effect on successful implementation of ERP.***

#### **2.8.6. Change Management and successful implementation of ERP**

Role of Change Management are the change the dynamics of the organization to ensure the new system succeeds by ensuring there is readiness to the demands of a very hard taskmaster, Educate users in current industry best practices and vigorously train them in the technical uses of the system, An ERP implementation project is a long and arduous endeavour. Sporadic and unfocused commitment to the project can doom it (Frimpon, 2012).

***H6: Change Management has a positive effect on successful implementation of ERP.***

#### **2.8.7. Cooperation and communication and successful implementation of ERP**

Strong communication within the entire organization during the implementation process increases success for ERP implementation. It allows the organization's stakeholders to understand the goal and the expected benefits of the project as well as to share the progress of the project. An "open information policy" protects the various communication failures for the project (Seo, 2013).

***H7: Cooperation and Communication has a positive effect on successful implementation of ERP.***

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## CHAPTER THREE

### RESEARCH DESIGN AND METHDOLOGY

#### 3.1. Introduction

This section contains details about the research philosophy, research approach ,research design, survey population, sample size and sampling techniques, data source, data collection instruments, data analysis technique, reliability and validity of the instruments as well as ethical considerations..

#### 3.2. Research Philosophy

Research philosophy is a system of beliefs and assumptions about the development of the knowledge. Saunders, Lewis and Thornhill (2009) argue that a well thought-out and consistent set of assumptions will create a credible research philosophy. That underpins the researcher's methodological choice, research question and data collection techniques as well as the analysis procedures. When conducting research, it is, therefore, important to be aware of the underlying research philosophy of the particular study as that implies a particular way of viewing the world (Saunders et al., 2009). Bryman and Bell (2011) distinguish the two dimensions of research philosophy as ontology; assumption and nature of reality and existence, and epistemology; the theory of knowledge which helps researchers understand the best ways of studying the nature of the world (Smith, Thorpe & Jackson, 2015). There are four different philosophies that can be adopted, and it is the research purpose and further, its research questions that dictate what philosophy is best suited to apply: (1) Positivism, (2) Realism, (3) Interpretivism, and (4) Pragmatism.

Positivism entails working with an observable social reality to produce law like generalisations (Saunders et al., 2009). Realism, on the contrary, sees its objects independently of the human mind. Thus, it suggests that our senses show the truth of reality (Bryman& Bell, 2011).

Interpretivism emphasises that humans are different from the physical phenomena because they create meanings and that the social world of business management is too complex to be grasped by explicit laws. Thus, they are critical to the positivist attempts of discovering definite, universal laws that apply to everybody. They argue that the researchers must, therefore, understand the differences of humans in a social context (Saunders et al., 2009).

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Lastly, pragmatism argues that there cannot be predetermined theories or frameworks that shape knowledge and truth. Neither do they accept that people are constructing their truths out of nothing, thereof, it is possible to adopt more than one position within a study (Smith et al., 2015; Saunders et al., 2009).

The philosophy adopted for this study was positivism, as the study aimed to reveal law like generalisations about the phenomena and new knowledge. Furthermore, since the study's aim was to examine critical factors that affect successful implementation of ERP. The study was conducted in a value-free way where the researchers was detached, neutral and independent with an objective stance, hence seeking to yield pure data and facts uninfluenced by human interpretation or bias.

### **3.3. Research approach**

According to Creswell (2005) research approaches are plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation. There are three research approaches that are commonly implemented in a research are quantitative, qualitative and mixed (Creswell, 2014) . Where one of them is not better than the others, all of this depends on how the researcher wants to do a research of study (Creswell, 2005).

Qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data (Creswell, 2014). It is concerned with subjective assessment of attitudes, opinions and behaviour. Research in such a situation is a function of researcher's insights and impressions. Generally, the techniques of focus group interviews, projective techniques and depth interviews are used (Kothari, 2004).

Mixed methods research is an approach to inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks (Creswell, 2014).

When come to quantitative research, it is an approach for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analysed using statistical procedures.



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It involves testing theories deductively, building in protections against bias, controlling for alternative explanations, and being able to generalize and replicate the findings (Creswell, 2014). According to Kothari(2004), it is generation of data in quantitative form which can be subjected to rigorous quantitative analysis in a formal and rigid fashion. Creswell (2005) asserted that it is a type of educational research in which the researcher decides what to study, asks specific, narrow questions, collects numeric data from participants, analyses these numbers using statistics, and conducts the inquiry in an unbiased, objective manner. Quantitative approach is one in which the investigator primarily uses postpositive claims for developing knowledge, i.e., cause and effect relationship between known variables of interest or it employs strategies of inquiry such as experiments and surveys, and collect data on predetermined instruments that yield statistics data (Creswell, 2009). According to Burns and Gorve (1993) quantitative approach helps researchers to test relationships between variables. Besides it also helps in examining and describing a cause and effect interactions among those variables. The general objective of the research was to examine the effects of critical factors that affect successful implementation of Enterprise Resource Planning in Commercial Bank of Ethiopia. Therefore, so as to meet this objective properly, quantitative approach was employed.

### **3.4. Research Design**

According to Coopers and Schindler (2014) research design is the blue print or the plan for collection, measurement and analysis of data. Kothari (2011) argues that research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data.

According to Kothari (2004) exploratory research studies are also termed as formulative research studies. The main purpose of such studies is that of formulating a problem for more precise investigation or of developing the working hypotheses from an operational point of view. The major emphasis in such studies is on the discovery of ideas and insights.

Descriptive research studies are those studies which are concerned with describing the characteristics of a particular individual, or of a group (Kothari, 2004).

Explanatory research design is those where the researcher tests the hypotheses of causal relationships between variables (Kothari, 2004).

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This study was to examine the effect of critical factors that affect the successful implementation of ERP in Commercial Bank of Ethiopia on the bases of fundamental literature that are presumed to be effective for the study. Accordingly, the effect of critical factors that affect Enterprise Resource planning implementation success evaluated based on the basic conceptual framework that was developed for this study, the researcher was preferred to use explanatory research, which helps to test the proposed hypothesis and show the causal effects of independent variables to dependent variable.

### **3.5. Target Population and sampling technique**

#### **3.5.1. Target population**

Coopers and Schindler (2014) postulate that a population is the total collection of elements about which we wish to make some references. Mugenda (1999) indicated that target population should be explicitly and unequivocally defined, otherwise statements about the target population after the analysis of data will not be trustworthy. For this study the target population was the employees of commercial Bank of Ethiopia at head office in Addis Ababa.

#### **3.5.2. Sampling technique**

The researcher must decide the way of selecting a sample or what is popularly known as the sample design. In other words, a sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population (Kothari, 1990). According to him sample can be either probability samples or non-probability samples. With probability samples each element has a known probability of being included in the sample but the non-probability samples do not allow the researcher to determine this probability. Probability samples are those based on simple random sampling, systematic sampling, stratified sampling, cluster/area sampling whereas non-probability samples are those based on convenience sampling, judgement sampling and quota sampling techniques. In this study, the researcher selected commercial Bank of Ethiopia through the use of purposive/ judgemental sampling technique. In order to collect relevant and accurate data associated with ERP implementation from the concerning bodies the researcher grouped the target population in to sub categories (departments) as shown the following table.

Table3. 1Categories of target population in to departments

No	Departments	No of employees
1	Business Operation Management	675
2	Accounting & Finance	486
3	Customer relationship management	349
4	Human resource management	86
5	Procurement officer	72
6	Marketing officer	61
7	Warehouse and inventory control	56
8	Quality assurance officer	98
9	IT/System operation	143
10	ERP System and change management	83
Total		2126

(Source, CBE HRM, 2011)

### 3.5.3. Sample Size

A sample size is a subset of total population used to give general views of the target population (Kothari, 2004). It represents the larger population and is used to draw inferences about that population. According to (Malhotra and Peterson, 2006; Zikmund, 2003) the larger the sampling size of a research, the more accurate the data generated. After dividing the population in to sub categories and due to time and financial limitations the nature of the population and sample size determination technique developed by (Carvalho, 1984) was used as a method to determine sample size for this study.

Table3. 2 sample size determination

Population Size	Sample size		
	Low	Medium	High
51-90	5	13	20
91-150	8	20	32
151-280	13	32	50
281-500	20	50	80
501-1200	32	80	125
1201-3200	50	125	200
3021-10,000	80	200	315
10,001-35000	125	315	500
35001-150000	200	500	800

(Source; Carvaloh, 1984)`

According to the above table the total number of employees in Commercial Bank of Ethiopia in Addis Ababa are 2126. Thus, from the 2126 employees 200 was consider as high sample size of the study as per Carvalho's (1984) sample determination method.

### **3.6. Nature and source of Data**

While deciding about the nature and source of data to be used for the study, it is obvious to keep in mind two types of data, primarily and secondary (Zikmund, 2003). The primary data those which are collected a fresh and/or the first time, and thus happen to be original in character. The secondary data, on the other hand are those which have already been collected by someone else and which have already been passed through a statistical process (Kothari, 1990). The selection of a method must balance several concerns including resource availability, creditability and analysis and reporting and the skill of the evaluator (Zikmund, 2003). Therefore, in this study, primary source of data was utilized through questionnaires so as to substantiate the study with relevant information and evidences.

### **3.7. Data collection instrument/method**

Data collection means gathering data and information to addressed questions of the investigation (Zikmund, 2003). In order to substantiate the investigation and to collect the

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pertinent data, it calls for an appropriate and convenient technique of data collection. Accordingly, in this study, standardized questionnaires with five point Likert scale was used. The standard questionnaires that measure top management support, project management, user training, business plan and vision, technological infrastructure, change management and cooperation and communication were adapted and modified from (Al-Sabaawi, 2015) and instruments that measure Successful implementation of ERP system were adapt from (Ifinedo, 2006).

### **3.8. Time Horizon**

The major distinction to decide on the time horizon of a research study depends whether the study is longitudinal or cross-sectional (Saunders et al., 2009). It entails if the research is a snapshot, which would be a cross-sectional study, or a diary, which is considered a longitudinal study. This study aims to focus on a particular phenomenon at one particular time. Hence, this time horizon, which is cross-sectional, correlates with survey strategy (Smith et al., 2015; Limpanitgul & Robson, 2009).

### **3.9. Method of Data Analysis**

The term analysis refers to the computation of certain indices along with searching for patterns of relationship that exist among data groups (Kothari, 1999). Accordingly, the analysis of data was carried out by using quantitative methods with the help of inferential statistical technique and descriptive analysis. Descriptive analysis (frequency and frequency distribution, valid and cumulative percentage) was used to analyse the general information of the respondents. Inferential statistics with a computer program called the statistical package for social science (SPSS V 23) was used. A regression analysis was conducted to test the effects of independent variables on dependent variables and also correlation analysis is used to test the relationship between independent and dependent variables. Before conducting regression analysis; assumption of normality, assumption of linearity and assumption of multicollinearity was carried out to make the inference more accurate.

### **3.10. Validity and Reliability Testing**

Establishing the validity and reliability of the instrument is an important aspect of instrument development and testing. Validity and reliability are the benchmark for assessing the quality of the instrument (Saunders, 2002). Reliability and validity are means of evaluation of research instruments.

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**Validity:** Define validity as the extent to which your research findings can be said to be accurate and reliable, and the extent to which the conclusions are warranted (Donald and Headlam, 2008). Assessing validity about questionnaires according to Saunders et al. (2009) refers to the ability of the questionnaire to measure what is intended to be measured. In a survey study, the measurement validity applies primarily to a quantitative study and has essentially to do with the question of whether a measure that is devised of a concept reflect the reality that it is supposed to be representing (Bryman& Bell, 2011; Saunders et al., 2009).Content validity was used to ensure that the information provided is what the study wants to achieve. This study was checked content validity through giving the instrument for academic experts and reviewing literatures.

**Reliability:**

The term reliability is concerned with the question if the results of the study are repeatable (Bryman& Bell, 2011). It measures the tendency of the instrument to consistently give the same result with the same group of people under the same condition (Sanders, 2002). Reliability, according to Eriksson and Kovalainen (2008), is the extent to which a measure, procedure or instrument yields the same result on repeated trials. In other words, reliability is to mean accuracy, dependability, consistence and stability. For this research, the internal consistency approach was exerted with the use of the Cronbach's Alpha ( $\alpha$ ) method, to ensure the reliability of this study. This statistic is mostly used to measure the consistency of responses to a set of questions that are combined as a scale. A value of 0.7 or above is typically employed "as a rule of thumb" and implies an acceptable level of internal consistency (Bryman& Bell, 2011; Saunders et al., 2009).The SPSS software package offers Reliability Alpha Cronbach's was used in the study.

**3.11. Ethical consideration**

Regarding the research ethics, the researcher was keep the research ethics. Data providers, organizations and institutions were properly acknowledged and the information collected from them used for the purpose of the research objective and the researcher respected issues related to confidentiality.

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## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND INTERPRETATION

#### 4.1. Introduction

This study was undertaken to examine critical factors that affect successful implementation of Enterprise Resource Planning (ERP) in commercial bank of Ethiopia. The data collected through the use of five point Likert scale questionnaires were analysed, presented and interpreted using SPSS version 23 statistical software. Correlation and regression analysis were conducted for scale typed questionnaire (Creech, 2011). Descriptive statistics was used to analyse and interpret demographic characteristics of respondents. The study used correlation analysis, specifically Pearson correlation to measure the degree of association between different variables under consideration. Regression Analysis was also used to test the effect of independent variable on dependent variable.

#### 4.2. Response rate

Basically this study was gathered exclusively through questionnaires as the primary research instrument. A total of 200 questionnaires were distributed to staff working different department which are directly related with the ERP implementation. From 200 sample size, only 176 were completed and returned, making a response rate of 88%. According to (Mugenda, 2003) a 50% response rate is adequate, 60% good and above 70% is very good. This also corresponds with Kothari (2004) assertion that a response rate of 50% is adequate, while a response rate greater than 70% is very good. This implies that based on this assertions; the response rate in this case of 88% is very good and enabled for further analysis.

**Table 4.1 Response Rate**

No of distributed questionnaires	Achieved	Response rate
200	176	88%

Source: survey data, 2019

#### 4.3. General Information of Respondents

This study was explained two demographic variables, namely educational back ground and work experience. These two variables were sufficient to offer a representation of the demographic of the frontline personnel in ERP implementation.

Based on the collected data from the respondents, among the total 176 respondents (70.5 %) of the respondents were found first degree holders; while 19.9% and 9.7% were second degree & above and diploma holders respectively.

**Table 4.2 Education levels of respondents**

Education level	Frequency	%	Valid %	Cumulative %
Diploma	17	9.7	9.7	9.7
First Degree	124	70.5	70.5	80.1
Second degree & above	35	19.9	19.9	100.0
Total	176	100.0	100.0	

Source: survey, 2019

This distribution of respondents by educational qualification implies that more than half of respondents (70.5%) are holder of first degree in addition to that 19.9 % were second degree and above. This implies that they are capable and understand the construct items to fill the response, thereby signifying high reliability of the obtained responses.

**Table 4.3 Work Experience of respondents in the organization**

Work experience	Frequency	%	Valid %	Cumulative %
1-5 years	56	31.8	31.8	31.8
5-10 years	53	30.1	30.1	61.9
More than 10 years	67	38.1	38.1	100.0
Total	176	100.0	100.0	

Source: survey, 2019

Regarding work experience of respondents 31.8% were 1-5 years, 30.1% were 5-10 years and 38.1% were above 10 years. In general 68.2% of respondents were above 5 years experiences in their organization. Therefore, they are able to answer the questions.

#### **4.4. Reliability of instrument**

In evaluating reliability of the instrument used, Cronbach's Alpha was computed to test the reliability of the questionnaires. According to Bryman and Bell (2011) all reliability tests carried out through the Cronbach's Alpha are subjected to a rule of thumb that states that the values of the factors in the study should not be lower than 0.7. The Reliability Statistics showed that the scale exhibits a high degree of reliability. This was indicative that the research tool was sufficiently reliable to carry out the study. A Cronbach's Alpha coefficient of 0.70 is a commonly suggested threshold of reliability test.



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**Table 4.4 Reliability Test (Cronbach's Alpha coefficients)**

<b>Constructs</b>	<b>No. of Items</b>	<b>Cronbach's Alpha</b>
Top management Support	5	0.974
Project Management	5	0.929
User Training	3	0.909
Business Plan & Vision	4	0.964
Technological Infrastructure	3	0.894
Change Management	3	0.907
Cooperation & Communication	3	0.898
ERP Implementation Success	5	0.907

Source: survey, 2019

#### **4.5. Inferential Statistics**

The researcher conducted correlation analysis first to measure the degree of association between different variables under consideration. While a multiple regression analysis so as to test the influence independent variables on successful implementation of ERP. The researcher applied the statistical package for social sciences (SPSS V 23) to code, enter and compute the measurements of the multiple regressions for the study. Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables (critical factors) or the percentage of variation in the dependent variable (successful implementation of ERP) that is explained by all the seven independent variables namely top management support, project management, user training, business plan and vision, technological infrastructure, change management and cooperation and communication.

##### **4.5.1. Correlation Analysis**

Correlation analysis was incorporated to describe the strength and direction of the linear relationship between the independent variables and the dependent variable (Pallant, 2001). Previous studies emphasized the importance of conducting correlation tests before the regression testing (Coakes and Steed, 2009). The linear relationship between variables can be measured by correlation coefficient ( $r$ ), which is commonly called Pearson product moment correlation. Person's " $r$ " mainly measures the data from the interval or ratio level and used to measure based on the deviation from the mean (Yabebal, 2017).

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Table 4.5 shows the measures of association and descriptive adjectives between the predictor variables.

**Table 4.5 Measures of association and Descriptive adjectives**

Measure of Association	Descriptive Adjective
> 0.00 to 0.20 ; < -0.00 to - 0.20	Very weak or very low
> 0.20 to 0.40; < -0.20 to - 0.40	Weak or low
> 0.40 to 0.60; < -0.40 to - 0.60	Moderate
> 0.60 to 0.80; < -0.60 to - 0.80	Strong or high
> 0.80 to 1.0; < -0.80 to - 1.0	Very high or very strong

Source: (Eachron, 1982)

According to the above table the researcher was evaluated the extent of correlation between dependent and independent variables.

**Table 4.6 Correlation Matrix between the Dependent and Independent Variables**

		TMS	PM	UT	BPV	TI	CM	CC	ERP
TMS	Pearson Correlation	1	.398**	.353**	.358**	.242**	.362**	.372**	.416**
	Sig. (2-tailed)		.000	.000	.000	.001	.000	.000	.000
	N	176	176	176	176	176	176	176	176
PM	Pearson Correlation	.398**	1	.435**	.587**	.463**	.454**	.507**	.591**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000
	N	176	176	176	176	176	176	176	176
UT	Pearson Correlation	.353**	.435**	1	.704**	.608**	.588**	.618**	.686**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
	N	176	176	176	176	176	176	176	176
BPV	Pearson Correlation	.358**	.587**	.704**	1	.675**	.764**	.698**	.810**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000
	N	176	176	176	176	176	176	176	176
TI	Pearson Correlation	.242**	.463**	.608**	.675**	1	.702**	.619**	.812**
	Sig. (2-tailed)	.001	.000	.000	.000		.000	.000	.000
	N	176	176	176	176	176	176	176	176
CM	Pearson Correlation	.362**	.454**	.588**	.764**	.702**	1	.698**	.828**

	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000
	N	176	176	176	176	176	176	176	176
CC	Pearson Correlation	.372**	.507**	.618**	.698**	.619**	.698**	1	.733**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000
	N	176	176	176	176	176	176	176	176
ERP	Pearson Correlation	.416**	.591**	.686**	.810**	.812**	.828**	.733**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N	176	176	176	176	176	176	176	176
**. Correlation is significant at the 0.01 level (2-tailed).									

Source: survey, 2019

#### 4.5.1.1. Correlation between independent variables and dependent variable

From stated in the previous chapter, a positive relationship is expected between the seven critical factors and successful implementation of ERP. While the study results of the correlation test between independent variables and dependent variables have also a positive correlation. The above matrix indicates significant correlation between critical factors and successful implementation of ERP.

Based on the correlation matrix the results on the correlation test between the independent variable top management support and the dependent variable successful implementation of ERP, there exists a statistical significant direct linear relationship between top management support and successful implementation of ERP at  $r=0.416$ ,  $p < 0.01$ . According to Eachron (1982) magnitude of correlation, the correlation matrix indicates that there is a moderate positive and statistically significant relationship which indicates that a positive increase in top management will result in a positive increase in successful implementation of ERP moderately.

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Similarly the correlation between project management and successful implementation of ERP is positive and they are significantly correlated ( $r = 0.591$ ) at  $P < 0.01$ . Accordingly, the relationship between the two variables is moderate.

Findings in correlation matrix present the result of correlation test between user training and successful implementation of ERP. The test indicates that there is a positive direction relationship at significance level 0.01. The test shows that there exists a significant statistical relationship between users training and successful implementation of ERP. The P value  $P < 0.01$ ,  $r = 0.686$ , which reveals the relationship is strong positive and an increase in user training will promote a positive increase in successful implementation of ERP.

Additionally, from the survey result, the correlation between business plan and vision and successful implementation of ERP is positive and they are significantly correlated at  $p < 0.01$ ,  $r = 0.810$ , which implies that a very strong relationship between the two variables and an increase in business plan and vision will elicit a positive increase in successful implementation of ERP.

Moreover, the correlation matrix output also verifies that a very strong positive correlation is observed between technological infrastructure and the successful implementation of ERP with a statistically significant result  $r = 0.812$  at  $P < 0.01$ . Similarly the correlation between change management and successful implementation of ERP is a very strong positive and they are significantly correlated at  $r = 0.828$ ,  $P < 0.01$ . Accordingly, the relationship between the two variables is very strong.

Lastly but not least the survey result also confirms Strong and statistically significant positive correlation between cooperation and communication and successful implementation of ERP with  $r = 0.733$  at  $p < 0.01$ .

Overall positive and statistical significant correlation between the seven critical factors and successful implementation of ERP is investigated with the help of SPSS V 23. Notably business plan and vision, technological infrastructure and change management are found to have positive and very strong correlation with successful implementation of ERP. User training and education and cooperation and communication have positive and strong correlation with successful implementation of ERP. Top management support and project management have positive and moderate correlation with successful implementation of ERP.

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#### 4.5.1.2. Correlation between independent variables

SPSS statistical output also proved that positive and significant correlation is observed between independent variables. Thus the correlation between Top management support and project management, User training, business plan and vision, technological infrastructure, change management and cooperation and communication have positive and they are significantly correlated at  $r=0.398$ ,  $r=0.353$ ,  $r=0.358$ ,  $r=0.242$ ,  $r=0.312$ ,  $r=0.372$  respectively at  $p<0.01$ . According to Eachron (1982) magnitude of correlation, the relationship between top management supports relatively to the other variables is low.

From the survey result, the correlation between project management with User training , business plan and vision, technological infrastructure, change management and cooperation and communication is positive and they are significantly correlated at  $r=0.435$ ,  $r=0.587$ ,  $r=0.463$ ,  $r=0.454$ ,  $r=0.505$  respectively at  $p<0.01$ . Based on Table 4.5 the relationship between project management with user training, business plan and vision, technological infrastructure, change management and cooperation and communication is moderate.

Based on the correlation matrix the results on the correlation test between user training with business plan and vision, technological infrastructure, change management and cooperation and communication is positive and they are significantly correlated at  $r=0.704$ ,  $r=0.608$ ,  $r=0.588$ ,  $r=0.618$  respectively at  $p<0.01$ . Accordingly, the relationship between user training with business plan and vision, technological infrastructure, change management and cooperation and communication is strong.

Similarly, the correlation between business plan and vision with technological infrastructure, change management and cooperation and communication is positive and they are significantly correlated at  $r=0.675$ ,  $r=0.764$ ,  $r=0.698$ , respectively at  $p<0.01$ . Based on Table 4.5 they are strongly correlated. Likewise the correlation between technological infrastructure with change management and cooperation and communication is positive and they are significantly correlated at  $r=0.702$ ,  $r=0.619$ , respectively at  $p<0.01$ . Accordingly, the relationship between technological infrastructure and the two variables is strong .Also the correlation between change management and cooperation and communication is positive and they are significantly correlated at  $r=0.698$   $p<0.01$ . As said by Eachron (1982) magnitude of correlation, the relationship between the two variables is strong.

## 4.5.2. Multiple Regression Analysis

In analysing data collected from the study, regression analysis was conducted to determine the effect of top management support and project management, User training, business plan and vision, technological infrastructure, change management and cooperation and communication on successful implementation of ERP in CBE. Before running multiple regression analysis, the researcher has conducted basic assumption tests for the model. These are normality of the distribution, linearity of the relationship between the independent and dependent variables and multicollinearity tests. Each test is explained below:

### 4.5.2.1. Normality Distribution Test

Multiple regressions need the independent variables to be normally distributed. Skewness and kurtosis are statistical tools which can enable to check if the data is normally distributed or not. According to Smith and Wells (2006), kurtosis is defined as “property of a distribution that describes the thickness of the tails. The thickness of the tail comes from the amount of scores falling at the extremes relative to the normal distribution”. Skewness is a measure of symmetry. A distribution or data set is symmetric if it looks the same to the left and right of the centre point. The skewness and kurtosis test results of the data is within the acceptable range -1.0 to +1.0 (Hair et. al, 2014) and it can be concluded that the data is normally distributed. The kurtosis and skewness results are shown in the following table and the data was normally distributed within the recommended values.

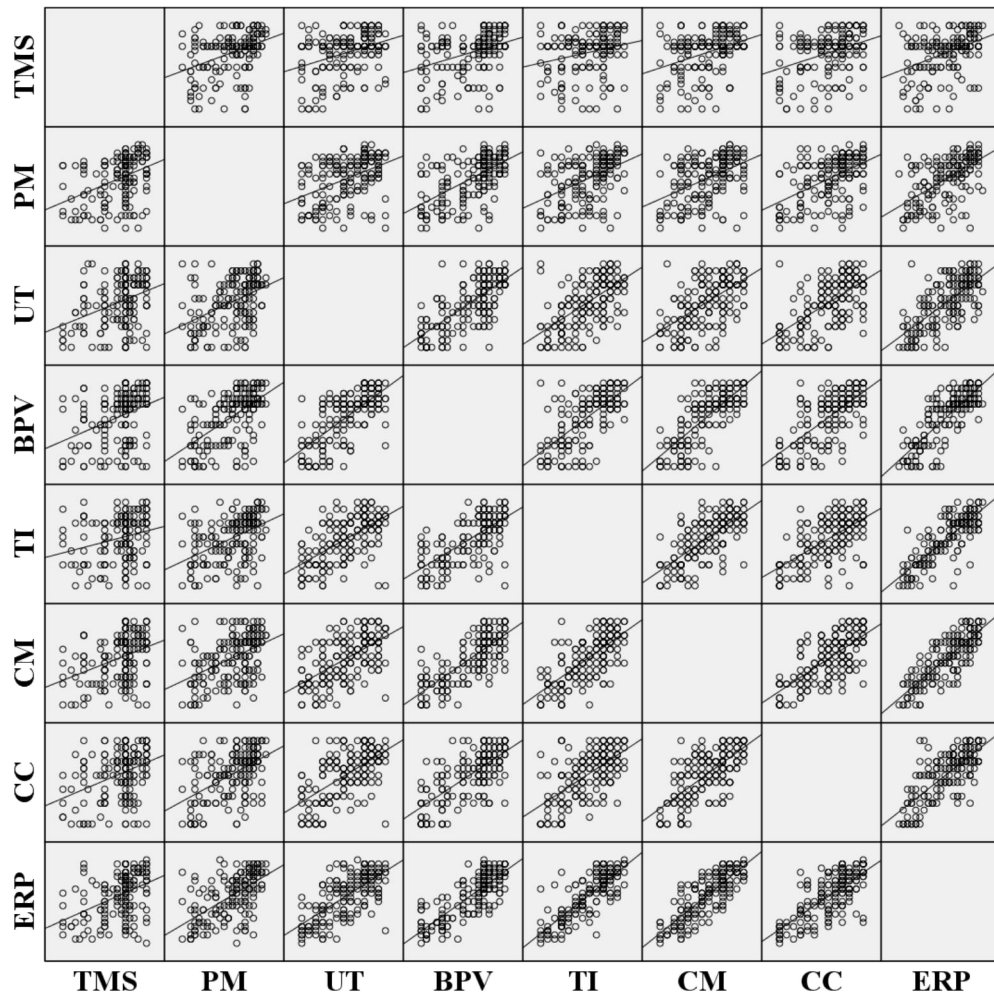
**Table 4.7 Test of normality**

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
TMS	176	-.909	.183	.508	.364
PM	176	-.617	.183	-.766	.364
UT	176	-.325	.183	-.984	.364
BPV	176	-.678	.183	-.736	.364
TI	176	-.458	.183	-.814	.364
CM	176	-.274	.183	-.872	.364
CC	176	-.581	.183	-.570	.364
ERP	176	-.386	.183	-.986	.364
Valid N (listwise)	176				

Source: survey, 2019

#### 4.5.2.2. Test of linearity

The second assumption for computing multiple regressions is test of the linearity of the relationships between dependent and the independent variables. As depicted in the scatter plot the visual inspections of the scatter plot shows there exists a linear relationship between the seven critical factors and successful implementation of ERP.



Source: survey 2019

Figure3. 1Test for linearity

#### 4.5.2.3. Multicollinearity Test

Multicollinearity refers to the situation in which the independent/predictor variables are highly correlated. When independent variables are multicollinear, there is “overlap” or sharing of predictive power. This may lead to the paradoxical effect, whereby the regression model fits the data well, but none of the predictor variables has a significant impact in predicting the dependent variable. This is because when the predictor variables are highly correlated, they share essentially the same information. Thus, together, they may explain a



great deal of the dependent variable, but may not individually contribute significantly to the model. Existence of multicollinearity can be checked using “Tolerance” and “VIF” values for each predictor variables. Tolerance values less than 0.10 and VIF (variance inflation factor) greater than 10 indicates existence of multicollinearity (Robert, 2006). For the researcher data, multicollinearity problem is not concern.

**Table 4.8 Multicollinearity Test**

Model	Collinearity Statistics	
	Tolerance	VIF
1 TMS	.766	1.305
PM	.591	1.691
UT	.445	2.249
BPV	.267	3.748
TI	.419	2.389
CM	.315	3.176
CC	.405	2.470

a. Dependent Variable: ERP

Source: survey, 2019

Generally: The three assumptions of multiple regressions are met and the next step was processing the regression analysis to determine the values of the model summary (R and R<sup>2</sup>), the model fit (ANOVA) and the beta coefficients. With the help of multiple regression analysis, model summary, ANOVA and Beta coefficient were determined and the regression model was developed. Accordingly, the relative effect of critical factors for successful implementation ERP was recognized.

### 4.5.3. Model Summary

In the model summary table below, the multiple correlation coefficients R, indicates there was a very strong positive relationship (R=0.922) between the dependent variable (successful implementation of ERP) and the independent variables notably, top management support, project management, user training , business plan and vision, technological infrastructure, change management, and cooperation and communication. The value of R Square (R<sup>2</sup>= 0.849) indicates that 85% of successful implementation of ERP could be explained by the independent variables of the study which encompass of top management support , project management, user training , business plan and vision, technological infrastructure, change management and cooperation and communication.

**Table 4.9 Model summaries**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.922 <sup>a</sup>	.849	.843	.41903

a. Predictors: (Constant), CC, TMS, PM, UT, TI, CM, BPV

Source: survey, 2019

#### 4.5.4. ANOVA Model Fit

The regression model overall fit can be examined with the help of ANOVA. Based on table 4.10 this study shows that the value of R and R<sup>2</sup> found from the model summary is statistically significant at (F=135.463), (P<0.001) and it can be said that there is a relationship between the predictors independent variables and successful implementation of ERP.

**Table 4.10 Analysis of Variance**

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	166.501	7	23.786	135.463	.000 <sup>b</sup>
Residual	29.499	168	.176		
Total	196.000	175			

a. Dependent Variable: ERP

b. Predictors: (Constant), CC, TMS, PM, UT, TI, CM, BPV

Source: survey, 2019

#### 4.5.5. Beta Coefficient

The standardized coefficients are the coefficients which can explain the relative importance of explanatory variables. These coefficients are obtained from regression analysis after all the explanatory variables are standardized. As shown from table 4.11, the standardized coefficient of technological infrastructure is the largest value followed by change management. Business plan & vision, user training, project management, and top management support, assumes ranks from three to six respectively. The larger the standardized coefficient, the higher is the relative effect of the factors to successful implementation of ERP. The significance tests of the seven explanatory variables indicate that six of the explanatory variables are significant with p-value P<0.05 and p<0.01 for predicting successful implementation of ERP. The only factor cooperation and communication has a p-value >0 .05 and this factor not statistically significant to predict successful implementation of ERP.

**Table 4.11 Unstandardized and standardized beta coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.326	.147		-2.223	.028
TMS	.078	.037	.073	2.128	.035
PM	.105	.039	.104	2.680	.008
UT	.109	.042	.106	2.725	.007
BPV	.146	.051	.165	2.850	.005
TI	.330	.046	.334	7.214	.000
CM	.286	.052	.294	5.505	.000
CC	.076	.044	.082	1.741	.084

a. Dependent Variable: ERP

Source: survey, 2019

#### 4.5.6. Unstandardized Beta Coefficient ( $\beta$ )

The results showed in table 4.11 indicate the variables coefficient of the regression test. These results were useful in the construction of the regression equation for the study. The independent variables in the study were; top management support ( $X_1$ ), project management ( $X_2$ ), user training ( $X_3$ ), business plan & vision ( $X_4$ ), technological infrastructure ( $X_5$ ), change management ( $X_6$ ), and cooperation and communication ( $X_7$ ). The dependent variable is successful implementation of ERP ( $Y$ ). The unstandardized beta coefficient of  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ ,  $\beta_5$ ,  $\beta_6$  and  $\beta_7$  represents the coefficients of the predictors of  $X_1$ ,  $X_2$ ,  $X_3$ ,  $X_4$ ,  $X_5$ ,  $X_6$ , and  $X_7$  respectively.  $\beta_0$  and  $\epsilon$  represents intercept point and error term respectively. Thus, the following regression equation was derived for successful implementation of ERP:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \epsilon$$

From table 4.11, the values assumed for  $\beta_0$  (constant) is -0.326, and slopes for the independent variables are;  $\beta_1=0.078$ ,  $\beta_2=0.105$ ,  $\beta_3=0.109$ ,  $\beta_4=0.146$ ,  $\beta_5=0.330$ ,  $\beta_6=0.286$

Thus, the regression equation for this test is;

$Y = -0.326 + 0.078 X_1 + 0.105 X_2 + 0.109 X_3 + 0.146 X_4 + 0.330 X_5 + 0.286 X_6$ . The study conclude that; a unit increase in top management support, results to a 0.078 unit increase in successful implementation of ERP, a unit increase in project management results to a 0.105 unit increase in successful implementation of ERP, a unit increase in user training results to a

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0.109 unit increase successful implementation of ERP, a unit increase business plan & vision results to a 0.146 unit increase in successful implementation of ERP, a unit increase technological infrastructure results to a 0.330 unit increase in successful implementation of ERP, a unit increase change management results to a 0.286 unit increase in successful implementation of ERP. Cooperation and communication results  $\beta= 0.076$  at  $p=0.84$  which is not statistically significant predictor of in successful implementation of ERP.

#### **4.6. Results and Analysis of Hypothesis**

##### ***Hypothesis 1: Top Management support and successful implementation of ERP***

Based on the correlation matrix the results on the correlation test between top management support and successful implementation of ERP is positive and statistical significant. Besides the standardized beta coefficient of top management support is  $\beta=0.73$ , at  $p<0.05$  which indicates top management support is one of significant explanatory variable for predicting successful implementation of ERP and the value of unstandardized beta coefficient is 0.078 at significant level  $P< 0.05$  which indicates a unit increases in top management results a 0.078 (7.8%) unit increase in successful implementation of ERP.

Previous literature and studies have support top management support as one of the important factors for ERP implementation (Domm et al., 2010; Dezdar, 2012; Swaminathan, 2011; Sanchez, 2007; Li Fang, 2005; Plant & Willcocks, 2007). As suggested by Kronbichler et al. (2009); Parr and Shanks, (2000); Shanks et al. (2000); Somers and Nelson, (2004) top management support is one of the most frequently factors that support the success of ERP system. Top management support is the key for the successful implementation of the ERP system (Loonam and Donagh, 2005). Nah and Lau (2001) noted that top management support is a very important factor that helps companies to successfully implement the ERP system.

Based on the findings of the study and prior literatures, the researcher deduced that top management support is one of the key factors of successful implementation of ERP. Existence of financial support from top management, support initiative, communicating IT strategy for employees of the organization from top management, monitor the implementation progress and provide clear direction for ERP project shall lead to the successful implementation of ERP in CBE in terms of cost, flexibility, reliability, allows data integration and competitive advantage. *Thus, hypothesis 1 is accepted.*

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### ***Hypothesis 2: Project management and successful implementation of ERP***

From the survey result, the correlation between project management and successful implementation of ERP is positive and statistically significant. Moreover from regression analysis the result of standardized beta coefficient is  $\beta=0.104$ , at  $p<0.01$ , which indicates project management is one of a significant explanatory variable for predicting successful implementation of ERP and the unstandardized beta coefficient value is  $\beta=0.105$  at  $p<0.01$  that is a unit increase in project management would yield a 0.105 increase in successful implementation of ERP.

This result corresponding with the view of (Umble, Haft & Umble, 2003; Nah & Delgado, 2006) effective project management is critical for the successful ERP implementation. A successful implementation of ERP system requires an effective project management (Rabaa'I, 2009). Sharma and Godla (1999) found that a lack of proper understanding of the project needs and the inability to provide leadership and guidance to the project are the main factors when ERP implementation fails. Thus, effective project management should define clear project objectives, develop a work and resource plan, and carefully track the project's progress. The formal project implementation plan defines project activities, commits personnel to those activities, and promotes organizational support by organizing the implementation process (ALdayel and Al-Mudimigh, 2011).

Accordingly the study findings and prior literatures, the researcher revealed that project management is one of the key factors of successful ERP implementation. Determining the starting and finishing dates of ERP implementation, assigning the responsibilities and power of all ERP management designing and implementation parties, allocation of a budget for ERP designing and implementation, defines clear project objectives, develop a work plan and resource plan, and careful track project's progress shall make possible successful ERP implementation in CBE in terms of cost, flexibility, reliability, allows data integration and competitive advantage. ***Hence, hypothesis 2 is accepted.***

### ***Hypothesis 3: User training and successful implementation of ERP***

The researcher conducted correlation analysis user training is found to be positively & significantly correlated with successful implementation of ERP. More over the standardized beta coefficient result is  $\beta=0.106$ , at  $p<0.01$ , which indicates user training is one of a significant explanatory variable for predicting successful implementation of ERP. And

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unstandardized beta coefficient value is 0.109 at  $p < 0.01$ , which is a unit increase in user training would yield a 0.109 increase in successful implementation of ERP.

This result supported by (Plant & Willcocks, 2007; Francoise, 2009; Bloemen et al., 2009; Swaminathan, 2011; Dezdar, 2012) user training is identified as one of the important factors for ERP implementation. Extensive education and training programme becomes essential during the process of implementing ERP system (Gargeya and Brady, 2005; Kronbichler et al., 2009; Rabaa'I, 2009). However, if companies ignore the users' involvement and training during the ERP system project this might lead to failure to implement ERP system. When the ERP system is up and running it is very important that the users be capable to use it, hence they should be aware of the ERP logic and concepts and should be familiar with the system's features (Yingjie, 2005).

Based on the findings of the study and prior literatures, the researcher supposed that user training is one of the critical factors of successful ERP implementation. Existence of training program for ERP implementation project team and training program for ERP end users, and existence of clear strategy for education and training shall lead to successful ERP implementation in CBE by assuring cost reduction, flexibility, reliability, data integration and competitive advantage. ***Thus, hypothesis 3 is accepted.***

#### ***Hypothesis 4: Business plan and vision and successful implementation of ERP***

According to the result found from the correlation matrix, correlation between business plan and vision with successful implementation of ERP is positive and they are significantly correlated. The results of the standardized coefficients obtained from regression analysis. The standardized coefficient of business plan and vision is  $\beta = 0.165$ , at  $p < 0.01$  which can explain business plan and vision statistically significant to predict successful implementation of ERP. In addition the value of unstandardized beta coefficient  $\beta = 0.146$  at  $p < 0.01$ , it shows a unit increase business plan and vision becomes successful implementation of ERP rise by 14.6%.

This is in line with prior research and literatures, Nah and Lau (2001) noted that the business vision must be stated clearly, and measurable goals of the ERP project should be clear and understandable. Clear project plan with comprehensive vision that can fit with the organizational goals are critical to ensure the success of the ERP project implementation. The project plan will provide a clear guidance to the project team which will help them to concentrate on the project goals and will avoid any misunderstanding of the project

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requirements and that eventually lead to successful ERP system implementation (Kronbichler et al., 2009). Many ERP implementations have failed as a result of lacking clear plans (Al-Fawaz, et.al, 2008)

Founded on the study and prior literatures, the researcher suggested that business plan and vision is one of the critical factors of the successful ERP implementation. Clear ERP project plan integrated with goals and vision of CBE that can provides a clear guidance to the project team, to achieving strategic advantage and satisfies customers and suppliers of CBE, which will help the successful ERP implementation in CBE by assuring cost reduction flexibility, reliability, data integration and competitive advantage. **Therefore, hypothesis 4 is accepted.**

***Hypothesis 5: Technological infrastructure and successful implementation of ERP***

Based on the correlation matrix the results on the correlation test between technological infrastructure and successful implementation of ERP is strong positive and significantly correlated. In multiple regression analysis, the standardized beta coefficient of technological infrastructure is  $\beta=0.334$ , at  $p<0.01$  which is the largest value from the seven explanatory variables significant for predicting successful implementation of ERP. The larger the standardized coefficient, the higher is the relative effect of the factors to successful implementation of ERP. Also the value of unstandardized beta coefficient  $\beta= 0.330$  at  $p< 0.01$ , it shows a unit increase technological infrastructure becomes a successful implementation of ERP rise by 33%.

Previous researchers have suggested that the system developers and managers should concentrate on developing better systems rather than focusing on user satisfaction (Patel, Picard, 2007; Frimpon, 2012). Bhatti (2002) argued that adequate IT infrastructure, hardware and networking are crucial for an ERP system's success. The quality of IT staff (i.e., knowledge of technological changes and up-to-date skills) is cited among the important factors required for IT systems success in general and for ERP implementation success in particular (Essex et al., 1998).

As a result of the study and prior literatures, the researcher suggested that technological infrastructure is the most crucial factors of the successful ERP implementation. So, CBE maintains adequate resources of IT infrastructure, adequate resources of networking infrastructure and check security issues are as the interest of employees in order to achieve a successful implementation of ERP. **Hence, hypothesis 5 is accepted.**

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### ***Hypothesis 6: Change Management and successful implementation of ERP***

The correlation matrix proved that the correlation between change management and successful implementation of ERP is positive and they are significantly correlated. More over from regression analysis the result of standardized beta coefficient is  $\beta=0.294$ , at  $p<0.01$ , which is higher value next to technological infrastructure. This indicates project management is one of a significant explanatory variable for predicting successful implementation of ERP. And the value of the unstandardized beta is  $\beta=0.286$  at  $p< 0.01$ , this shows a unit increase in change management would yield a 0.286 rise in successful implementation of ERP.

The study findings agree that change management is another frequently cited factor that determines the success of ERP system implementation (Rabaa'I, 2009). Shaul and Taber (2012) noted that, the implementation of new ERP system is typically encountered with high resistance form the end users as they are worried that the new system might change many of their routine job lifestyle such as ease of use, importance, job status, responsibilities, access to critical information, and job security. However, this problem should be dealt with during the planning phase and through extensive change management programme. Burca et al., (2005) stated that many of the employees need a change management programme to help them to understand and accept the new changes that will occur in their operations. Therefore, to achieve a successful ERP implementation it becomes mandatory to educate and train the users of the ERP system on the new change that affects their daily tasks (Park and Kusiak, 2005).

From the study findings and prior literatures, the researcher implied that change management is one of the crucial factors of the successful implementation of ERP. Existence of required flexibility in the administration system to apply ERP system, modify the organization structure to suit ERP implementation, change policies and instructions to suit ERP implementation to assure the successful implementation of ERP in CBE in terms of cost reduction, flexibility, reliability, allows data integration, and improves competitive advantage. ***Thus, hypothesis 6 is accepted.***

### ***Hypothesis 7: Cooperation and communication and successful implementation of ERP***

Finally the survey result confirms a strong positive & statistically significant correlation between cooperation and communication and successful implementation of ERP. However, the standardized beta coefficient result is  $\beta=0.082$ , at  $p>0.05$  which indicates cooperation and



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communication is not statistically significant explanatory variable for predicting successful implementation of ERP. And the unstandardized beta coefficient value is  $\beta=0.76$  at  $p>0.05$ , this shows also it is statistically insignificant.

The findings in this study differ with Kronbichler et al. (2009) who suggest that cooperation and communication is considered as essential to the success of implementing ERP system. Communication should take place at all stages of implementing ERP system so that employees could be aware of the progress and understand the benefits of having enterprise system in place (Rabaa'I, 2009). It is equally important to define goals and communicate the results to the involved participants (Kronbichler et al., 2009). This can be done via face to face communication such as regular update meetings or asynchronous communication such as email or posters in conspicuous locations (Rabaa'I, 2009).

Although the prior literatures, proved that cooperation and communication is essential to the success of implementing ERP system. The findings of the study confirmed that, it is not statistically significant explanatory variable for predicating successful implementation of ERP. Due to this, the researcher supposed that, CBE should be give emphasis for cooperation and communication between the project team and end users, communication between top management and the project team, communication between end users and communication about the plan of ERP project implementation in order to obtain the required effect on implementation of ERP in CBE by assuring flexibility, reliability, data integration and competitive advantage. Or else in the absence of cooperation and communication the sustainability of ERP implementation in CBE is in danger. ***Thus, hypothesis 7 is rejected.***

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## CHAPTER FIVE

### SUMMARY OF MAJOR FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1. Introduction

The purpose of this study was to examine the effect of critical factors that affect successful implementation of ERP. Based on the findings of the study this chapter presents summary of major findings, conclusions, and recommendations for the case organization as well as further study.

#### 5.2. Summary of major findings

- ❖ This study was done with the total sample size of 200 and out of which, 176 questionnaires were returned with a response rate of 88%.
- ❖ In evaluating reliability of the data, tests of reliability was carried out through the Cronbach's Alpha and the Statistics show that the scale exhibits a high degree of reliability with Alpha coefficient of all variables  $> 0.7$ .
- ❖ From the survey result the correlation matrix indicates positive and statistical significant correlation between critical factors and successful implementation of ERP with the value of ( $r= 0.416-0.828$ ) at  $p<0.01$ . And also SPSS statistical output also proved that positive and significant correlation is observed between independent variables.
- ❖ Moreover in the model summary the multiple correlation coefficients R, indicates there is a very strong positive relationship ( $R=0.922$ ) between the dependent variable (successful implementation of ERP) and the independent variables which is critical factors.
- ❖ The value of R Square ( $R^2= 0.849$ ) indicates that 85% of successful implementation of ERP could be explained by the independent variables of the study. Correspondingly based on ANOVA model fit the value of R and  $R^2$  found from the model summary is statistically significant at ( $F=135.463$ ), ( $P<0.001$ ) and it can be said that there is a relationship between the predictors independent variables and successful implementation of ERP.
- ❖ Finally the value of standardized beta coefficients indicate that the six of the explanatory variables are significant with p-value ( $P<0.05$  and  $p<0.01$ ) for predicting ERP implementation success. The only factor Cooperation and communication has a

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p-value  $>0.05$ , and this factor not statistically significant to predict successful implementation of ERP.

### **5.3. Conclusions**

The main purpose of this study was to examine the effect of critical factors that affect successful implementation of ERP on CBE. Based on the findings presented in the previous section, the following conclusions are drawn:

- ❖ Based on the correlation test result the seven critical factors and successful implementation of ERP were positively and significantly correlated. The seven critical factors were top management support, project management, user training, business plan and vision technological infrastructure, change management, and cooperation and communication.
- ❖ Technological infrastructure and change management are the most influential factors for successful implementation of ERP.
- ❖ Even though literature has demarcated cooperation and communication as one of the critical factor for successful implementation of ERP. The study indicated that it is not statistically significant to predict for successful implementation of ERP which shows that the cooperation and communication between project team and users, and between top management and the project team are not properly planned or they communicate poorly in commercial Bank of Ethiopia.
- ❖ Technological infrastructure in terms of adequate resources of IT infrastructure, adequate resources of networking infrastructure and security issues are managed by the interest of users. The finding from this study has confirmed, it is the most explanatory variable and extremely significant for predicting ERP implementation success. Accordingly the sustainability of technological infrastructure is critical and has preeminent effect on successful implementation of ERP.
- ❖ User training is the critical factor without it, successful implementation of ERP is almost impossible and it is recognized as influential predictor of successful implementation of ERP. Experienced and competent coaches well prepared training manual and intensive user training as well as extensive education and regular training programme are essential for successful implementation of ERP.
- ❖ Project management is examined as an important factor having significant effect on successful implementation of ERP. Effective project management is required in terms of determining the starting and finishing dates of ERP implementation,

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responsibilities and power of all ERP management designing and implementation parties and allocate budget, defining clear project objectives, develop a work plan and resource plan, and carefully track the project's progress.

- ❖ Top management support is one of the basic factors for initiative and financial support for ERP project, facilitate communicating IT strategy for all employees in the organization, monitor the implementation progress and secure the employee acceptance of the changes. These are help for sustainability of successful implementation of ERP. Thus this variable properly handled in CBE during ERP implementation.
- ❖ Business plan and vision as one of the important factors for successful implementation of ERP. Based on the study the organization outlines a clear vision for ERP designing and implementation, achieving strategic advantage through the work plan and provides a clear guidance to the project team. Thus it is important predictor for successful implementation of ERP, which shows that business plan & vision are properly addressed in CBE.
- ❖ Change management is examined as an important factor having significant effect on successful implementation of ERP. Effective change management is required in terms of flexibility in the administration system to apply ERP system, modify the organization structure to suit ERP Implementation and change policies and instructions to suit ERP implementation are appropriately addressed in CBE. That is why the study confirmed that change management is statistically significant to predict successful implementation of ERP.
- ❖ This study concludes that six critical factors were considered during the ERP implementation as the most important factors from the 7 factors identified by the literature. These factors are top management support, project management, user training, business plan and vision, technological infrastructure and change management. These six critical factors can help CEB to achieve successful implementation of ERP.

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## 5.4. Recommendations

Based on the major findings of the study the following recommendations were drawn:

- In previous studies proved that cooperation and communication is indispensable role for successful implementation of ERP. Despite this study indicated that it is not important predictor for successful implementation of ERP, which shows that CBE has to be conferring intensive consideration for cooperation and communication. Unless the sustainability of successful implementation of ERP in CBE is in query.
- The regression analysis revealed that successful implementation of ERP is impacted more by technological infrastructure. Therefore, special emphasis should be given to maintain the availability of adequate and quality IT infrastructure and networking infrastructure in order to sustain successful implementation of ERP in CBE.
- From the study findings change management is examined as the second important factor having significant effect on successful implementation of ERP. Accordingly working on this factor will enable to increase successful implementation of ERP by greater magnitude than the rest factors excluding technological infrastructure. Thus, it is recommended to give special emphasis to this factor.
- The correlation and regression analysis revealed that the support from top management is moderate. Hence the top management in CBE has to be give emphasis for ERP implementation. Unless it is difficult to run with success.
- All over the factors that examined by this study are the critical factors for successful implementation of ERP except cooperation and communication, therefore CBE has to be give emphasis for cooperation and communication in order to maintain the success of ERP implementation and reduces the possibility of ERP implementation failure.
- This study exerts a base for other organization which wants to adapt ERP system. By recognizing the ERP implementation success factors in order to minimize the possibility of ERP implementation failure. And it is as a lesson for companies which faced ERP implementation failure.

## 5.5. Limitation and Recommendation for further Research

- ✚ Whereas this study contributes to a better understanding of successful implementation of ERP by examining the seven critical factors that affect successful implementation of ERP, there are many factors which affect ERP implementation success. Thus

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further study should be undertaken to consider other factors that affect successful implementation of ERP.

- ✚ This study showed how factors affect the successful implementation of ERP in CBE. Further studies should be carried out in a larger scale in different organization and in different companies' level.
- ✚ The other limitation of this study is time horizon. That is this study was done based on the existing scenario of the level and usage of ERP, so future researchers will conduct longitudinal studies can also be conducted on companies in order to properly understand the dynamics of ERP implementation project.
- ✚ The fact that the nature of single case study is its generalizability of research, results is very limited. Therefore future research should be conducted in multiple case studies of ERP implementation to strengthen the findings of success factors.
- ✚ This study was limited by a quantitative research method to examining critical factors that affect successful implementation of ERP in CBE. Thus future researchers should refine the methodology to focus on a comparative study between different companies.

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## APPENDICES

### APPENDIX I

#### Bahir Dar University

#### College of Business and Economics

#### Department of Logistics and supply chain management

**Dear respondent,**

First I want to put my gratitude for your time in responding to the research questions provided below. I'm a postgraduate student at Bahir Dar university college of Business and Economics from the department of logistics and supply chain management, currently working on thesis project. The response you provide me gives a critical input to my research "Factors that affect successful implementation of Enterprise resource planning (ERP).

You have been identified as one of the respondents for this study and you are kindly requested to fill the questionnaire. Information given will be held with confidentiality and will be used purely for research purposes.

Instruction: Please tick (✓)inside the boxes as appropriate

#### **Part I: Demographic characteristics of respondents**

1. Qualification:

Diploma

First degree

Second degree & above

2. Experience:

Less than 1 year

1-5 year

6-10 year

More than 10 years

**Part II: Factors affecting successful implementation of Enterprise Resource Planning ERP.**

The following statements relate to factors that affect successful implementation of ERP. Follow the instructions given for your responses.

Please indicate the extent of your agreement or disagreement on each item, (1= strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree)

<b>Top management support (TMS): is adequate support from first level managers and commitment of resource (Basri, 2016).</b>						
<b>Code</b>	<b>Items</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>TMS1</b>	There is a financial support from top management to ERP project					
<b>TMS2</b>	Top management support initiative of ERP project.					
<b>TMS3</b>	Existence of communicating IT strategy for all employees in the organization from top Management to ERP project.					
<b>TMS4</b>	Top management monitor the implementation progress and Provide clear direction of the project					
<b>TMS5</b>	Top management are important to secure the employee acceptance of the changes					
<b>Project management (PM): skills and knowledge use in coordinating the scheduling and monitoring of defined activities to ensure that project objectives are achieved (Basri, 2016).</b>						
<b>Code</b>	<b>Items</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>PM1</b>	Our organization determines the starting and finishing dates of ERP implementation					

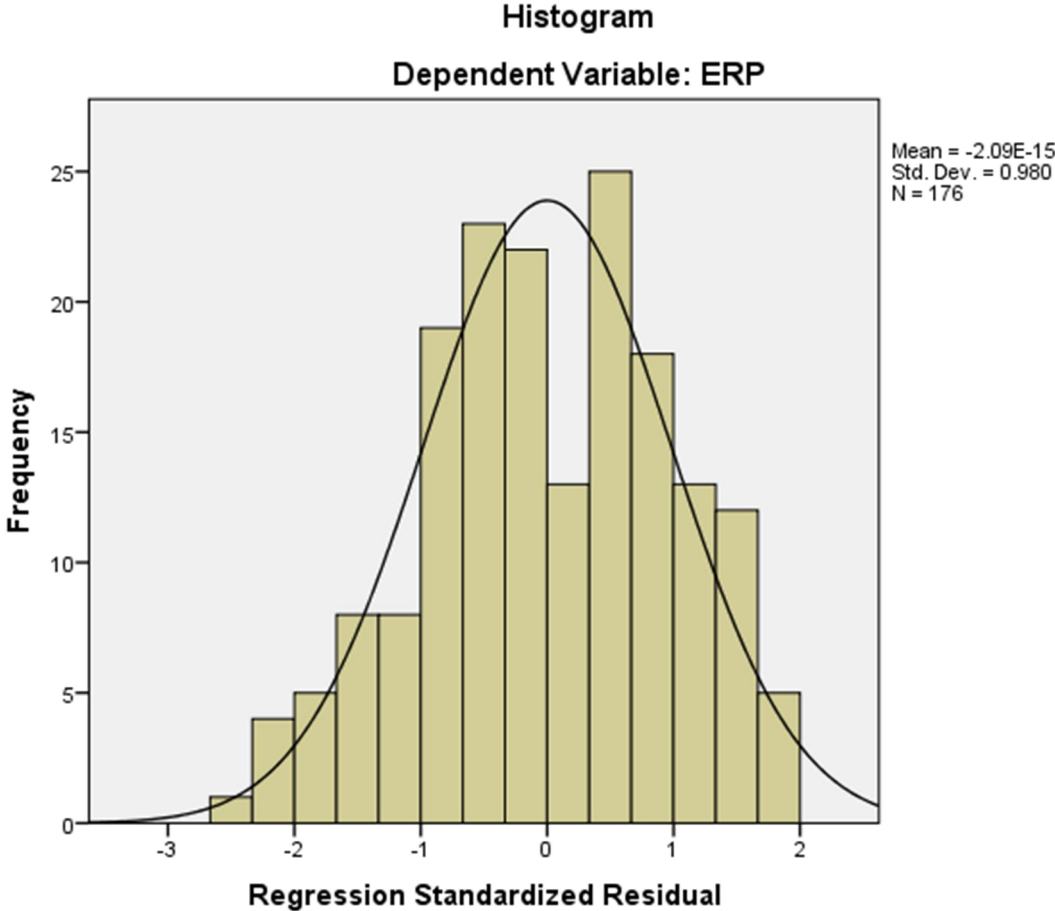
<b>PM2</b>	Our organization determines the responsibilities and power of all ERP management designing and implementation parties					
<b>PM3</b>	The management allocate of a budget of ERP designing and implementation.					
<b>PM4</b>	Project managers understand the ability of the company to use the system and achieve optimum use					
<b>PM5</b>	Project management defines clear project objectives, develop a work and resource plan, and carefully track the project's progress.					
<b>User Training (UT): is training used for robust understanding of how the system works and how to use it (Bajwaet al., 2004).</b>						
<b>Code</b>	<b>Items</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>UT1</b>	There is training program for ERP implementation project team.					
<b>UT2</b>	Existence of training program for ERP end users.					
<b>UT3</b>	Existence of clear strategy for education and training.					
<b>Business Plan and Vision (BPV): a clear project plan with comprehensive vision that can fit with the organizational goals and it provide a clear guidance to the project team (Kronbichler et al., 2009).</b>						
<b>Code</b>	<b>Items</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>BPV1</b>	Our organization outlines a clear vision for ERP designing and implementation					
<b>BPV2</b>	Our organization aims to achieving strategic advantage through the work plan.					
<b>BPV3</b>	Our work/project plan Provides a clear guidance to the project team					
<b>BPV4</b>	Our business plan satisfies our customers & suppliers					
<b>Technological infrastructure (TI): is refers to the selection of appropriate ERP package, adequate ERP version, adequate software configuration and suitability of software and hard</b>						



<b>ware (Jarrar, Al-Mudimigh, Zairi, 2000).</b>						
<b>Code</b>	<b>Items</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>TI1</b>	Existence of adequate resources of IT infrastructure					
<b>TI2</b>	There is adequate resources of networking infrastructure					
<b>TI3</b>	The security issues are interest of our organization.					
<b>Change Management (CM): is a structured approach to shifting /transitioning the CBE from a current state to the desired future state (Basri, 2016).</b>						
<b>Code</b>	<b>Items</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>CM1</b>	Existence of required flexibility in the administration system to apply ERP system					
<b>CM2</b>	The possibility to modify the organization structure to suit ERP implementation					
<b>CM3</b>	The possibility to change policies and instructions to suit ERP implementation					
<b>Cooperation and Communication (CC): is communication among several departments /hierarchies, e.g. Between project team and end users about ERP implementation (Sherry Finney, 2007).</b>						
<b>Code</b>	<b>Items</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>CC1</b>	Existence flow of information between the project team and end users.					
<b>CC2</b>	Existence plan of Communications for ERP project implementation.					
<b>CC3</b>	Existence of Communications between top management and the project team					
<b>Successful implementation of ERP (ERP): it refers to existence of successful ERP implementation, it increases the organization performance in terms of flexibility, higher quality data for decision making, reduced inventories, improved coordination throughout the supply</b>						

<b>chain (Gattiker and Goodhue, 2005)</b>						
<b>Code</b>	<b>Items</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>ERP1</b>	Our ERP is Flexible					
<b>ERP2</b>	Our ERP allows data integration					
<b>ERP3</b>	Our ERP is reliable					
<b>ERP4</b>	Our ERP improves competitive advantage					
<b>ERP5</b>	Our ERP reduces organizational costs					

APPENDIX II A



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## APPDINX II B

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: ERP

